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CONTENTS OF VOLUME X

JANUARY, 1941, NUMBER 1

Ankylosis of the Mandible. G. W. N. Eggers, M. D., Galveston 1

Endometriosis as a Cause of Intestinal Obstruction: Report of 2 Cases. G. P. Grigsby, M. D., Louisville 8

Fatal Infection of the Abdominal Wall Following Appendectomy. R. J. White, M. D., Fort Worth 13

Diagnosis and Treatment of Trigeminal Neuralgia, With Consideration of Total and Subtotal Section of the Fifth Cranial Nerve. W. McK. Craig, M. D., Rochester, Minnesota 17

The Perineal-Abdominal Operation for Cancer of the Rectum. A. O. Singleton, M. D., Galveston 30

Non-Parasitic Cysts of the Spleen; Report of a Case. T. D. Watts, M. D., and H. J. Warthen, M. D., Richmond 35

Direct X-Irradiation of Tumors. J. D. Hancock, M. D., and Jesshill Love, M. D., Louisville 39

Sterility Relieved by Left Salpingostomy Following Right Salpingo-Oophorectomy. W. T. Black, Jr., M. D., Memphis 42

Ovarian Hemorrhage. H. J. Copeland, M. D., and T. J. Floyd, Jr., M. D., Griffin, Ga. 45

A Brief History of Surgical Societies. M. W. Sherwood, M. D., and Terrell Speed, M. D., Temple, Texas 50

Editorial: The Role of the Liver in Surgery. F. F. Boyce, M. D., New Orleans 56

Book Reviews 59

Roster of The Southeastern Surgical Congress 63

Roster of The Texas Surgical Society 76

FEBRUARY, 1941, NUMBER 2

Vaginal Smears Correlated to Ovarian Function (4½ Months Fetus Through Puberty). M. J. Bennett, M. D., Philadelphia, and P. B. Russell, Jr., M. D., Memphis 79

Intestinal Intubation. Malcom Thompson, M. D., Louisville 88

A Critical Review of 1600 Blood Transfusions in Private Practice. J. E. Watson, Jr., M. D., and R. L. Sanders, M. D., Memphis 93

Stenosing Tendovaginitis at the Radial Styloid Process. C. F. Wood, M. D., Louisville 105

The Relationship between Fecaliths in the Appendix and Gangrenous Appendicitis. W. J. Tennison, III, M. D., and C. F. Dixon, M. D., Rochester, Minnesota 111

Pulmonary Complications in Surgery of the Biliary Tract: A Study of 132 Consecutive Cases. H. B. Asman, M. D., Louisville 116

Single Unit Cotton Thread Surgical Technic. K. P. A. Taylor, M. D., Puerto Armuelles, Panama 125

The Use of the Hanging Cast in Treatment of Fractures of the Humerus. R. T. Hudson, M. D., Louisville 132

Pancreatic Lithiasis with Diabetes: Report of 4 Cases. T. H. Thomason, M. D., Fort Worth, Texas 135

Editorials:

The Richmond Postgraduate Surgical Assembly. Irvin Abell, M. D., Louisville 144

Muscle Changes in Infantile Paralysis. W. G. Stuck, M. D., San Antonio.... 145
Richmond! R. L. Sanders, M. D., Memphis..... 136
Book Reviews 150

MARCH, 1941, NUMBER 3

The Richmond Surgical Assembly. Irvin Abell, M. D., Louisville..... 153
Surgical Correction of Oligomenorrhea, Menorrhagia and Menopause by Ovarian Isoplastism. M. J. Bennett, M. D., Philadelphia, and P. B. Russell, Jr., M. D., Memphis 154
Hormones Interpreted Quantitatively (Cyclic Variations of Some). M. J. Bennett, M. D., Philadelphia; P. B. Russell, Jr., M. D., Memphis, and L. C. Ramsey, Philadelphia 164
Observations on Malignancies of the Large Bowel. Isidore Cohn, M. D., New Orleans 173
Fractures of the Jaws. W. G. Hamm, M. D., Atlanta..... 185
Regional Ileitis. H. E. White, M. D., St. Augustine, Florida..... 194
Midline Aberrant Thyroid: Report of a Case. J. G. Gay, M. D., Atlanta..... 199
Gynecologic Problems of Elderly Women. W. N. Jones, M. D., Birmingham..... 203
Torsion of the Omentum. J. D. Martin, Jr., M. D., Atlanta..... 210
The Relation of Allergy to Surgical Diagnosis in Diseases of the Gastrointestinal Tract. A. E. Cohen, M. D., Louisville..... 216
Editorials:
When a Doctor Completes His Medical Education He Should Retire. B. T. Beasley, M. D., Atlanta..... 220
Pass in Review 221
Book Reviews 223

APRIL, 1941, NUMBER 4

Medicine in the National Defense Program. Irvin Abell, M. D., Louisville..... 225
The Prevention of Deformities in Compound Fracture Treatment. C. S. Venable, M. D., and W. G. Stuck, M. D., San Antonio..... 234
Immunologic Prophylaxis and Therapy in Human Staphylococcal Infections. A. B. Longacre, M. D., New Orleans..... 247
Pseudomyxoma Peritonei from Ruptured Mucocele of Appendix. D. P. Hall, M. D., Louisville..... 264
Carcinoma of the Prostate: Its Conservative Surgical Treatment. G. J. Thompson, M. D., Rochester, Minn..... 271
Ovarian Hormonal Harmony. M. J. Bennett, M. D., Philadelphia, and P. B. Russell, Jr., M. D., Memphis..... 279
Ludwig's Angina. J. I. Berlin, M. D., Jersey City..... 289
Editorial: The Richmond Assembly..... 298
The 1941 Business Session of the Congress..... 299

MAY, 1941, NUMBER 5

Cod Liver Oil Therapy of Wounds and Burns. P. C. Hardin, M. D., Monroe, N. C. 301
Hormonal Therapy of Fibromyomas of the Uterus. R. B. Greenblatt, M. D., and E. A. Wilcox, M. D., Augusta..... 339
The Diagnosis and Treatment of Ectopic Pregnancy. F. H. Falls, M. D., Chicago 347

Treatment of Acute Fractures of the Neck of the Femur. H. B. Boyd, M. D., Memphis 364

Editorial: Is the Bassini Operation Obsolete? F. K. Boland, M. D., Atlanta..... 372

Presentation of Memorial Gavel. T. C. Davison, M. D., Atlanta..... 376

Book Reviews 377

JUNE, 1941, NUMBER 6

Conservative Surgery in Tumors of Bone. B. L. Coley, M. D., New York..... 379

Traumatic Rupture of the Spleen and Eventration of Spleen. B. C. Willis, M. D., and H. A. Cole, M. D., Rocky Mount, N. C..... 393

Sulfa-drugs and Internal Fixation in the Treatment of Compound Fractures. W. C. Campbell, M. D., and Hugh Smith, M. D., Memphis..... 409

Non-penetrating Trauma of the Abdomen. W. L. Estes, Jr., M. D., Bethlehem, Pa. 427

The Management of Perforating Gunshot Wounds of the Abdomen: Based on a Study of 369 Cases. E. L. Rippy, M. D., Nashville..... 441

Editorial: Dr. Willis Cahoon Campbell. R. L. Sanders, M. D., Memphis..... 451

JULY, 1941, NUMBER 7

The Endocrine Aspects of Chronic Cystic Mastitis. C. F. Geschickter, M. D., Baltimore 457

An Instrument to Simplify Pelvimetry. O. R. Troje, M. D., Fairfield, Ala..... 487

The Technic of Individual Ligation in Pneumonectomy and Extramediastinal Individual Ligation in Lobectomy: An Analysis of the Authors' Series. F. P. Coleman, M. D., and J. G. Seastrunk, M. D., Columbia, S. C..... 491

Hormonal Relationships and Vaginal Smears in Pregnancy. M. J. Bennett, M. D., Philadelphia; P. B. Russell, Jr., M. D., Memphis, and L. C. Ramsey, U. S. N., Philadelphia 510

Vaginal Changes During Normal Menstrual Cycle. M. J. Bennett, M. D., Philadelphia, and P. B. Russell, Jr., M. D., Memphis..... 519

Editorials:

Vitamin K. J. G. Gay, M. D., Atlanta..... 530

Military Service 532

Book Reviews 534

AUGUST, 1941, NUMBER 8

Chronic Subdural Hematoma of the Cerebrum. E. F. Fincher, M. D., Atlanta..... 537

The Management of Acute Intestinal Obstruction. C. G. Heyd, M. D., New York City 548

Cysts of the Vagina, with Report of a Case. J. O. Lisenby, M. D., Atmore, Ala..... 554

Management of Abortion. C. G. Collins, M. D., and J. C. Weed, M. D., New Orleans 557

Mesenteric Tumors. J. D. Hancock, M. D., Louisville..... 569

Surgery in Peptic Ulcer. J. O. Morgan, M. D., Gadsden, Ala..... 575

Traumatic Intracerebral Pneumatocele: Report of a Case. D. H. Echols, M. D., and R. G. Holcombe, Jr., M. D., New Orleans..... 589

Importance of Vitamin Therapy in the Preparation and Postoperative Care of Surgical Patients. V. P. Sydenstricker, M. D., Augusta, Ga..... 592

The Results of Radium Treatment of Cancer of the Cervix. W. L. Peple, M. D., Richmond 600

Editorials:
Dr. Anson Jones, Last Texas President. W. G. Stuck, M. D., San Antonio.... 607
Military Service, II 612
Book Reviews 613

SEPTEMBER, 1941, NUMBER 9

Surgical Treatment of Adenomatosis of the Colon. F. W. Rankin, M. D., Lexington, Ky. 615
Certain Anatomic and Physiologic Aspects of the Intervertebral Disc. F. K. Bradford, M. D., Houston, Texas..... 623
The Treatment of Recent Compound Wounds. R. A. Griswold, M. D., Louisville 630
Obstructive Jaundice Caused by Perforating Duodenal Ulcer. A. C. Scott, Jr., M. D., Temple, Texas 637
Chemotherapy of Infections of the Central Nervous System. C. C. Nash, M. D., Dallas 648
Duodenal Drainage in the Diagnosis of Gallbladder Disease. H. C. Myers, M. D., Philippi, W. Va. 653
Indications for Surgery in Duodenal Ulcer. J. L. Bradfield, M. D., Dallas, Texas 663
Cancer of the Larynx: Diagnosis, Treatment and Results, with Observations on the Relation of Benign Tumors to Cancer. Gabriel Tucker, M. D., Philadelphia 671
The Use of Sulfanilamide Powder in Abdominal Surgery. Q. B. Lee, M. D., Wichita Falls, Texas 680
Editorials:
Statistics. Isidore Cohn, M. D., New Orleans..... 686
The 1942 Postgraduate Surgical Assembly to be in Atlanta..... 689
Military Service, III 689
Sectional Meetings 690
Book Reviews 691

OCTOBER, 1941, NUMBER 10

Multiple Dissimilar Carcinomas of the Stomach. R. L. Sanders, M. D., Memphis.. 695
Conservatism and Pelvic Inflammation. D. M. Clardy, M. D., Hopkinsville, Ky... 705
Pathology and Surgical Management of Acute Head Injury. E. S. Gurdjian, M. D., Detroit 711
Sulfanilamide in the Local Treatment of Traumatic Wounds. R. O. Joplin, M. D., Louisville 733
The Role of the Fascia in Low Back Pain. J. C. Pickett, M. D., Morgantown, W. Va. 738
The Management of Fracture-Dislocation of the Neck. C. P. Graham, M. D., and J. F. Robertson, M. D., Wilmington, N. C..... 747
The Emergency Treatment of Burns. W. C. Tenery, M. D., and J. H. Tenery, B. A., Waxahachie, Texas..... 759
Editorial: The Interdependence of Medicine and Surgery. W. B. Martin, M. D., Norfolk 765
Book Reviews 771

NOVEMBER, 1941, NUMBER 11

Surgery of the Biliary Tract. F. M. Douglass, M. D., Toledo, Ohio..... 773
The Principles Governing the Diagnosis and Treatment of Acute Cranio-Cerebral Injuries. Cobb Pilcher, M. D., Nashville 783

Traumatic Fistula of Stenson's Duct. M. B. Welborn, M. D., Evansville, Ind.... 793
The Relief of Contractures of the Knee Following Extensive Burns. W. G. Hamm, M. D., and J. H. Kite, M. D., Atlanta..... 795
A Survey of 496 Cases of Vaginal Bleeding. A. E. Imler, M. D., Philadelphia.... 802
A More Effective Surgical Mask. E. J. Poth, M. D., Baltimore..... 810
Carcinoma of the Ovary. H. R. Shands, M. D., and R. L. Clark, Jr., M. D., Jackson, Mississippi 813
Osteitis Fibrosa Cystica. I. M. Wise, M. D., Mobile..... 819
Tuberculosis of the Breast. W. P. Nicolson, Jr., M. D., Atlanta, and C. E. Gillespie, M. D., Memphis..... 825
Editorials:
Sectional Meetings 845
Book Reviews 847

DECEMBER, 1941, NUMBER 12

Free Full Thickness Skin Graft for the Relief of Burn Contracture of the Neck. T. G. Blocker, Jr., M. D., Galveston..... 849
Ruptured, Gangrenous Left-Sided Appendicitis: Report of a Case. W. C. Kennedy, M. D., Florence, Ala..... 858
Congenital Hydrocephalus Complicating Labor: Report of Cases. E. M. Wilder, M. D., and L. F. Moldavsky, M. D., Baltimore..... 861
The Exteriorization of Colonic Cancers. Curtice Rosser, M. D., Dallas..... 874
Secondary Intrarectal Solid Teratoma of the Ovary. M. H. Pulskamp, M. D.; R. A. Griswold, M. D., and F. L. Blair, M. D., Louisville..... 880
Hemangioma of the Terminal Ileum with Recurrent Hemorrhages from the Rectum. R. J. White, M. D., Fort Worth..... 886
Liposarcoma of the Stomach: Report of a Case. M. J. Abrams, M. D., Brewton, Ala., and J. S. Turberville, M. D., Century, Fla..... 891
Editorial: The Role of Trauma in the Causation of Hernias. H. J. Shelley, M. D., Fort Worth 897
Urology Award..... 901
Book Reviews..... 902
Index to Volume X..... 909

The Southern Surgeon, the second regional journal devoted to a specialty in the United States, is published by The Southern Surgeon Publishing Company, a subsidiary of The Southeastern Surgical Congress, for the advancement of surgery particularly in the South. In addition to publishing papers presented before the Postgraduate Surgical Assembly of The Southeastern Surgical Congress, and before the Texas Surgical Society, it welcomes good surgical papers regardless of their geographic origin. It aspires to encourage surgeons in the Southern States, especially the younger ones, to record their own observations and original work.

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ANKYLOSIS OF THE MANDIBLE

G. W. N. Eggers, M. D., F. A. C. S.
Galveston

CONCEALED deformities arouse little attention and a minimum of mental anguish. Visible deformities may elicit sympathy, but more often contribute to the curiosity or amusement of others and to the embarrassment and personality damage of the afflicted one. The cross-eyed movie actor, the stuttering pig, the deaf grandpappy all have their humorous (?) appeal; the hunchback, the club-foot, and the one-eyed or peg-legged villain cast their dark shadows of horror across our dramatic stage. Yet, what is really more serious than the lack of beauty in most peoples' faces? However, this complaint is so common to most of us we bear it in silence. Nevertheless, the deformity we are to consider here has contributed one outstanding character of the comic strip. May they receive the attention they deserve.

Restriction of the mandible not only disfigures the individual with the affliction but places him as a social outcast because of his inability to join in the necessary and pleasant social function of companionate eating. These factors contribute to the mental anguish and fan it into an inferiority complex. It is certainly important if the profession can relieve these individuals of much of the embarrassment.

Restriction of the mandible may be:

1. inflammatory,
2. fibrotic,
3. bony.

The inflammatory restriction is due to edema of trauma, osteomyelitis or associated conditions. The fibrous type is extra-articular

OPK

Presented before the Texas Surgical Society, Houston, Oct. 8, 1940.

Department of Surgery, Orthopedic Division, University of Texas, and Texas State Hospital for Crippled and Deformed Children.

and may be mild or extensive due to the amount of fibrosis and cicatrical tissue. Bony ankylosis results from trauma or infection and may simply involve the joint structures, or be extra-articular as well,

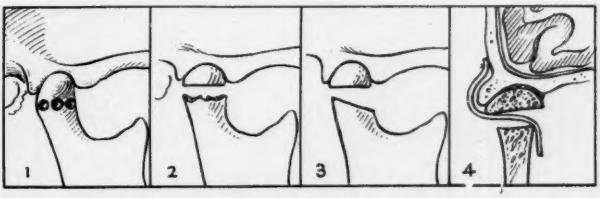
Fig. A. Unilateral mandibular ankylosis
a. Showing facial asymmetry
b. Note chin recession

forming a plate of bone which may include the coronoid process. Fibrosis may or may not accompany it but usually does not.

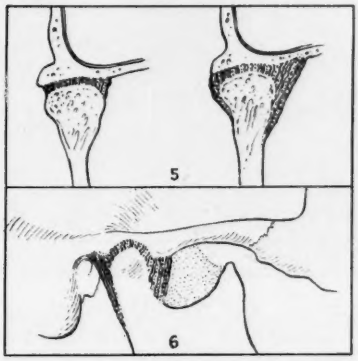
The first (inflammatory) group improves as the edema subsides and active motion restores the function of the mandible. The second (fibrotic) group may demand plastic surgery to replace the restricting scar tissue. The third (bony) group will be considered in this discussion.

The usual etiology is trauma or an infection such as mastoiditis. The majority of cases occur in the first years of life. This is important because the experience of many is that about half of the patients unfortunately do not present themselves for operation until between 20 and 30 years of age.

The ankylosis may involve the joint structures only (fig. 5) or there may be an extensive bony proliferation making a solid plate of bone from the zygoma to the coronoid process (fig. 6). Therefore, when recreating a false joint the problem depends on the extent of the bony union.



Division of mandible—fascial curtain



Types of bony fusion

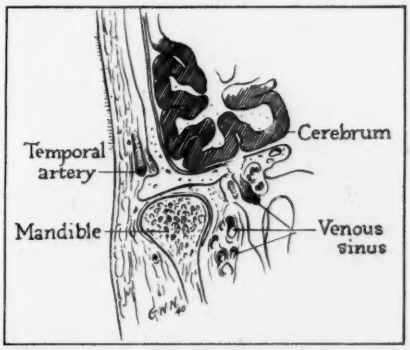
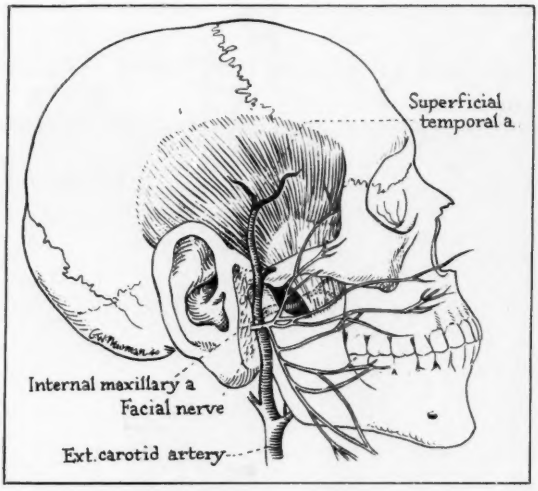


Fig. 7 Relation of Cerebrum to Mandibular Joint

Clinically, the history involves the usual etiologic factors and the side involved may be easily distinguished. It is necessary to determine accurately whether the lack of motion is due to bony ankylosis or fibrous restriction. There is always slight apparent motion in unilateral ankylosis which unfortunately is often mistaken for fibrous restriction. Careful examination of the buccal cavity usually determines the correct diagnosis.



Anatomical Relations of Mandibular Joint.

The x-ray studies are not reliable because of the difficulty of demonstrating the mandibular joint. The ramus, however, is shortened on the affected side.

Fig. 9. Reconstructed joint

Due to epiphyseal involvement and loss of functional response, the growth of the side ankylosed is restricted if the joint destruction occurred before the growth period was completed (15 years).

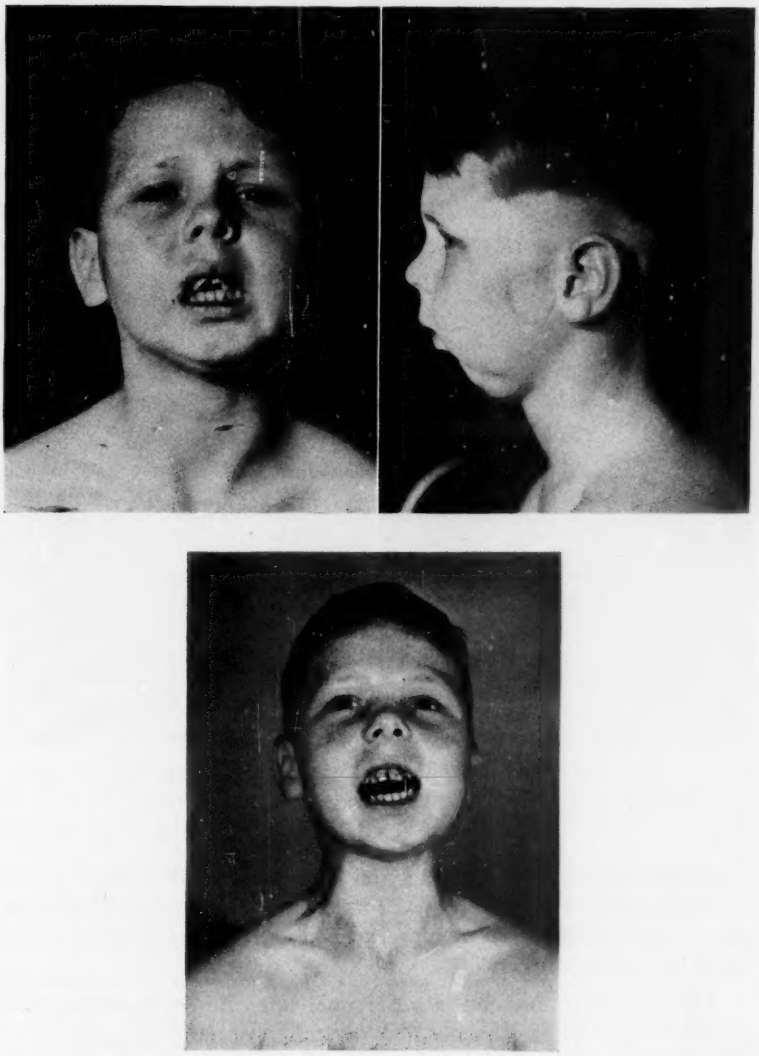


Fig. B. Extensive bony ankylosis—previous operative failures
a. Before operation
b. Showing previous operative scars
c. One year postoperative

These cases show the retracted chin, displaced toward the affected side which is well rounded in contrast to the flat normal side. When bilateral involvement is present the findings are identical, and the diagnosis is based on this observation.

When the mandible is affected later in life the foregoing criteria are not available, and the side involved is not so easily demonstrated. The history may decide if one or both joints is involved. If not, perhaps the differentiation is decided by surgical exploration.

The methods of treating the ankylosis vary, but are based on restoration of motion. The mandible has been resected, the joint

Fig. C. Ankylosis of mandible, unilateral
a. Endeavoring to open mouth
b. One year postoperative

reconstructed, or simply a section of bone removed leaving the condyloid process in the fossa. Fascia, heterogenous and autogenous, or no interposition of material are used as determined by the surgeon's experience.

The matter of incision is a personal one. There are many and are based on two approaches, one over the joint and the other from mandibular margin which reflects the masseter upward. After all, it is merely the selection of one which does not violate any basic anatomic laws and gives satisfactory visibility.

The anatomic structures subject to possible injury as shown in fig. 1 are the temporal artery, facial nerve, and internal maxillary artery. There is a definite area over the joint, easily accessible and approached by an incision over this area. Proceeding subperiosteally from above one can identify the zygoma and then the joint.

The structures are retracted, care being taken not to damage the frontalis branches of the facial nerve. The bone is divided between the base of the ramus just distal to the condyloid process. This process is not disturbed because the roof of the mandibular fossa supports the cerebrum (fig. 7) and good function does not demand its removal.

The bone is removed by hand drill (figs. 1, 2 and 3) and chisel. Allowing the ramus to be longer posteriorly has the advantage of decreasing the width of the articulating area. Removing the bone at this point, it is found to be comparatively thick and also angulated medially. As the inner side is reached the internal maxillary artery must be remembered. Certainly, damage to any of these arteries is not important from a circulatory standpoint but from ease of operation they may be embarrassing if damaged.

After removal of about one-half inch of bone the question is whether or not to use fascial intervention. The source of the fascia or muscle used matters little, and in simple ankylosis perhaps no fascia is necessary since many have satisfactory results from mere bony excision. However, when one sees cases in which previous operations have failed, he is inclined to believe that fascia may after all serve a useful purpose. Therefore, we routinely use a curtain of fascia attached by two small silk sutures and merely draped over the new bony surfaces (fig. 4). In extensive bony ankylosis it certainly seems the reasonable method of choice.

The after treatment is rest for about seven days until discomfort and pain are quite relieved. After that the patients usually need little encouragement to use the mandible. The threaded top type of dilator is often useful in adults.

If the chin deformity of these individuals is unsightly they can be greatly improved by methods familiar to the plastic surgeons.

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ENDOMETRIOSIS AS A CAUSE OF INTESTINAL OBSTRUCTION

Report of Two Cases

GUY P. GRIGSBY, M.D., F.A.C.S.
Louisville

THE ENDOMETRIUM which lines the uterine cavity is composed of a characteristic glandular epithelium, a loosely bound connective tissue, rich in small round spindle cells and containing some smooth muscle cells. It is when a combination of these tissues grow elsewhere than in the normal location, an adenoma resembling endometrium is formed. The term of "endometriosis" was first applied to this condition by J. A. Sampson. The profession has generally accepted this term although it implies that the mature endometrium is the source of the growth. However, this implication is not in accord with many of the theories advanced to explain the origin of the growth.

Sampson has classified this misplaced endometrial tissue into four groups: First, direct or primary endometriosis, which is equivalent to an adenomyoma of the uterine wall. There is a direct invasion of the myometrium by the mucosa lining the uterine cavity. Secondly, peritoneal or implantation endometriosis, where endometrial-like tissue is scattered throughout the pelvis, appears first on the peritoneum but later it may invade the underlying structures. Thirdly, the transplantation endometriosis, which may occur in the scars of abdominal incisions after operation upon the pelvic organs. Fourthly, metastatic endometriosis, which includes extraperitoneal lesions in situations similar to those of metastasis from cancer of pelvic organs.

In the past few years many articles have appeared in the literature in regard to this subject. No definite findings have been obtained in regard to the etiology or the treatment, and for this reason I will not take your time in theorizing particularly as to its etiology.

In regard to pathology, certain characteristics are common in all cases of endometriosis, regardless of the location in which the lesion occurs. The most prominent characteristic of endometriosis is the presence of blood, which is sometimes fresh but more often is undergoing disintegration, but it is far more common to see the accumulation of repeated bleedings. The color developed from this is usually reddish-brown to purple, or even black. The more usual condition encountered is the formation of cysts, which may vary in size from a few millimeters to several centimeters in diameter. The

Read before the Louisville Surgical Society, Dec. 5, 1940.

so-called chocolate cysts of the ovary, or tarry cysts, are perhaps the most characteristic. The response to hormonal stimulation demonstrates the close relationship to normal endometrium. During the height of menstruation engorgement occurs, to be followed by regression. This cycle occurs periodically until menopause. This physiologic activity is most readily studied and demonstrated in surface lesions, these occurring at the umbilicus, in laparotomy scars, or in the vagina.

The definite relationship between ovarian function and the activity of growth and symptoms of endometriosis must be given consideration in regard to the method of treatment. Regardless of the theory which best explains the endometrial lesion, the hypertrophy or retrogression of that lesion depends upon the presence or absence of hormonal stimulation from the ovary. For that reason, two methods of treatment are suggested; first, complete removal of the growth where practical, and secondly, complete or partial removal or destruction of the ovaries.

With few exceptions, endometriosis occurs within the reproducing period, that is, between the ages of 18 and the menopause. Naturally the younger the woman the more important it is to maintain the function of the ovaries and the possibility of pregnancy. Frequently there are a large number of small symptomless lesions discovered only at operation, and for these cases a deferred treatment is recommended. Partial excision of the lesion and frequently partial resection of the ovary will retard the growth and decrease the stimulation of ovarian secretion until the normal menopause occurs. I would not advise radio-therapy in young women for this condition. With this type of growth the complication of adhesions to adjacent organs must be considered. Particularly is this true of the intestines, with subsequent obstruction as a possibility. Strange to say, the literature contains very little in regard to this complication, and for that reason I thought the two cases herein reported would be of some interest.

Case Reports

Case 1. The first patient was 48 years of age and was still having normal menstrual periods. She had one child 21 years old.

She was first seen by me Oct. 28, 1938. The attack had begun early that morning. The pain at that time was general throughout the abdomen and had been preceded by nausea and vomiting. Later on the pain was referred to the right lower quadrant. These pains were rather intense and paroxysmal in character. There was no pain associated with the bladder function.

She was seen by her family physician early in the morning and he made a diagnosis of acute appendicitis. I saw her about 4:00 o'clock that same afternoon. The general examination was essentially negative. The abdominal examination showed some general abdominal distention with localized tenderness

over McBurney's point. The pelvic examination was essentially negative, except that the uterus was retroverted and fixed.

I was not entirely satisfied with the diagnosis of appendicitis because there did not seem to be enough tenderness and rigidity. A blood count showed 13,000 white cells and a polymorphonuclear count of 84 per cent. She was sent to the Norton Infirmary for observation. Upon admittance to the hospital the white count had dropped to 10,000 and the percentage of polymorphonuclears 78. Her temperature in the afternoon was 99 and later went to 100.

Consultation was requested and she was seen by two other consultants who concurred in the possibility of appendicitis and urged that the abdomen should be opened.

She was operated upon about 10:30 that night. Under cyclopropane anesthesia a lower median incision was made. Upon opening the abdomen considerable serosanguineous free fluid was found in the cavity. The appearance of the appendix was entirely normal, being practically sclerosed. The uterus was retroverted and fixed, being held there by rather firm adhesions. Upon freeing these adhesions a characteristic endometrial lesion was found. Since these was considerable distention of the small intestine, an obstructive lesion of the bowel was considered. We started to read the small bowel at the cecum. About 18 inches from this point several lesions were found on the small bowel characteristic of endometrial implants. At this point an adhesion had occurred between two loops of the bowel causing volvulus. This portion of the bowel was rather markedly injected, and above that point the ileum was much distended, indicating that partial obstruction was present. Adhesions were easily separated and free continuity of the bowel was established. Due to the patient's age, and the prospect of an early menopause, nothing further was done. This patient made an uneventful recovery and has remained entirely well.

CASE 2. This patient was 32 years old and unmarried. Her occupation that of secretary. She was first seen by me on May 23, 1939. She had always had good health. Her menstrual periods had always been normal.

About two months previous to the time I first saw her, she had an attack of acute abdominal pain, which she said lasted about a week. The family physician diagnosed it as "intestinal flu." Since that attack she had been having attacks of nausea with some general abdominal distress. She said she did not have indigestion and could eat anything she desired. She did, however, have a feeling of fulness after her meals.

The general examination showed a woman of healthy appearance. Her pulse was normal. The abdominal findings were essentially negative. The pelvic organs were entirely negative. From this examination no definite diagnosis could be obtained.

She was sent to Dr. Joseph C. Bell for a gastrointestinal study. Dr. Bell's report was essentially negative and his summary was that the stomach, esophagus and duodenum were normal. The colon was normal aside from the fact that there was moderate increase in the tone of the cecum at its junction with the appendix. This probably indicated that mild appendiceal disease was causing just a little reflex irritation of the cecum. The changes were not marked and the clinical importance should be evaluated in the findings of the case. Nothing else of importance was noted.

The patient was advised of the result of this examination and told to beware of any sudden pain in her abdomen, and to consult me or some other doctor immediately in the event that she started to have pain.

I next saw her on June 6, 1939. She came into the office reporting that she had been taken ill at 12:30 a.m. that morning with nausea, vomiting, and persistent pain in the epigastrium. Despite the fact that the pain and nausea persisted, she had endeavored to go to work that morning.

She was exceedingly nauseated and during the course of the examination vomited an enormous amount of greenish fluid. The abdomen showed marked rigidity over the right rectus muscle and tenderness over McBurney's point. Pressure over the right side of the abdomen caused intense pain in the epigastrium. There was considerable abdominal distention.

In view of the patient's history, and the result of the gastrointestinal study, I thought it was definitely a case of acute appendicitis. The blood count made at that time showed a white count of 12,000 with 90 per cent polymorphonuclears. She was sent to the Jewish Hospital for immediate operation.

Through a right gridiron incision a moderately inflamed appendix was found and removed, but the presence of bloody serum in the abdomen made me suspect that some obstruction of the bowel might be present. Examination of the terminal ileum revealed a mass in the pelvis. This was freed and brought out into the wound: it proved to be volvulus involving about 12 inches of the terminal ileum. There was much distention of the bowel above the obstruction. There were two distinct loops of bowel involved with an interval of about 5 inches of normal bowel intervening. The loops were so densely adherent to each other that freeing of the bowel was found to be impractical. After due consideration, I decided to do a resection with an end-to-end anastomosis. Before the anastomosis was done the right ovary was brought into the incision: it contained a moderate sized chocolate cyst. Resection of this ovary was done. The resection of the bowel was done without incident, and I felt that adequate continuity of the bowel lumen had been obtained. The abdomen was closed without drainage.

The pathologic report was as follows: "Appendix 80 mm. by 8 mm., having a congested, moderately inflamed peritoneum. The lumen contained semi-solid feces. Approximately 100 to 123 mm. section of small intestine which was kinked and bound by adhesions in such a way that there appeared to be partial obstruction at two definite areas. The peritoneum showed fibrous adhesions and had a yellowish-green and dark red appearance. Sections of the intestine contained blood-tinged mucus and dissection of the mass showed the obstruction to be due entirely to external adhesions.

"Microscopic sections of the appendix showed moderate sclerosis. There was also congestion of the peritoneum and infiltration of the wall of the appendix by lymphocytes. The intestines showed the wall to contain numerous glandular structures which resemble the uterine endometrium. Around these areas were small spindle cells characteristic of endometrial stroma. In places there was marked pigmentation by hemosiderin. There was also lymphocytic reaction.

"Diagnosis: Congestion of appendix, chronic periappendicitis. Endometriosis of intestinal wall."

This patient had a very easy postoperative course. Temperature was never above 99, the wound healed without infection, and she left the hospital on her ninth day postoperative and has remained well since.

Conclusion

While edometriosis involving the walls of the intestines is not particularly uncommon, the condition is frequently symptomless. Most cases will show only mild digestive disturbances or constipation, with pain, if present, usually limited to the time of menstruation.

Rarely have definite obstructive lesions been observed. The opportunity of examining and operating upon two such cases within a year seemed unique. These are reported in some detail because of the unusual symptoms, and the different treatment which was indicated.

FATAL INFECTION OF THE ABDOMINAL WALL FOLLOWING APPENDECTOMY

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THE case I am reporting I believe is extremely rare. None of the many consultants that were called had seen a like situation nor could the Librarian of the American Medical Association give any pertinent references on the subject.

L. L. G., an electrician aged 29, was admitted May 28, 1939 and died June 20, 1939. About 4 a. m. on the 28th he had severe general cramping abdominal pain soon followed by nausea and vomiting. He was seen about 10 a. m. by Dr. Frank Sanders who suspected appendicitis. I saw him at 1 p. m. He then had very slight tenderness, no rigidity, no fever and his appendix was apparently palpable through the abdominal wall! He was sent to the hospital where at 5:30 p. m. he had an obvious acute appendicitis with a temperature of 98.8 degrees, pulse 76, sharply localized tenderness, some muscle spasm and a white count of 18,400. Under spinal anesthesia and with the abdominal wall relaxed the appendix was again easily felt. A McBurney incision exposed it lying just under the anterior abdominal wall and tightly distended. (This is mentioned because of a unique chance observation. As the tense organ was delivered through the wound it suddenly collapsed discharging its contents back into the cecum and became quite flaccid except for moderate infiltration of its wall. This must happen many times unobserved in people who recover suddenly from sharp attacks of appendicitis.) Appendectomy was easily done with ligation, phenol application to stump and inversion with dulox. The pathologic report was acute diffuse appendicitis. Late the next afternoon his temperature was 101 and he had many coarse rhonchi in his chest. Sulfapyridine (gr. x q. 4 h) and carbon dioxide-oxygen inhalations were begun. No evidence of massive atelectasis could be recognized. The next day he began a profuse expectoration of purulent material and this lasted for several days without recognizable bronchopneumonia. The sulfapyridine was stopped after six days and the chest gradually cleared.

From the day following his operation he complained of pain and soreness about his wound. On the fourth day it looked well with a slight thickening laterally but no redness. The pain and soreness I thought were due to his severe cough. The clips were removed on the sixth day. At this time there was induration and marked tenderness out to the spine of the ilium laterally and for a short distance mesially but no redness. The next day it had spread in every direction but most rapidly onto the flank. The hardness seemed so deep seated that, though it was almost certainly a cellulitis rather than an abscess, it seemed wise to open the wound. A clamp was inserted and about an inch of the center of the wound separated apparently down to the peritoneum. Only a little bloody serum came away. The next day the pain he had complained of from the start was still more marked and the induration had spread slightly. Under gas anesthesia the finger was inserted and the wound widely opened down to the peritoneum. A small hematoma was found but no pus. A striking woody feel of the tissues was noted in all the deeper layers of

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the wound. Through what was apparently infiltrated peritoneum a stiff hard mass could be felt, evidently the head of the cecum. A direct smear showed no organisms and only an occasional pus cell. Plain and anaerobic cultures showed no growth. The smears and cultures were repeated two days later with the same findings.

My note on June 9 states, "This resembles a mild type of Meleney's symbiotic staphylococcus and micro-aerophilic streptococcus infection without actual gangrene. Sulfanilamide should help control it." Although there was no gangrene the question of cautery excision was raised by consultants but I had felt the depths of the wound and realized that this could not be done. He was given massive doses of sulfanilamide from the day the wound was opened, the sulfapyridine having been stopped the day before. For the first two weeks while sulfanilamide was pushed the spread was very slow but never entirely checked. After this intensive trial, because of nausea and its obvious failure to control the infection, sulfanilamide was stopped and from then on the spread was more rapid. The advancing edge was sharply demarcated and moderately firm. Around the wound and gradually fading away from it was a reddish violet mottled area of woody hardness at first but which gradually developed a firm putty-like feel with pitting edema. Throughout the illness the open wound was bright red and there was only a minimal serous discharge. There was never any fluctuation anywhere at any time. Several days before death the scrotum and penis became involved. Toward the end the edema had spread down as far as the middle of the front of the right thigh and over the upper part of the front of the left thigh, all the way across the abdomen, past the spinous processes behind and nearly up to the right axilla. There was never any gangrene. In addition to the sulfanilamide he was treated with hot stupes, ultraviolet light, therapeutic x-radiation, two transfusions, one of normal blood and one from a donor who had recovered recently from a gangrenous infection of the skin of the arm. Nothing seemed to influence the course of the disease. At the insistence of one consultant he was given 200 c c. in two equal doses of scarlet fever immune serum from the Michael Reese Hospital-Serum Institute in Chicago. In a telephone conversation with the director of the Institute he confirmed my views that it was wasting money and effort and this proved to be true. He also said in a subsequent letter after I had written a detailed description of the patient's course that he had heard of nothing similar but suspected an unidentified anaerobic bacillus.

The blood counts were remarkable. Two days after opening the wound his white cell count was 31,000, two days later 36,400, three days later 45,000, two days later 55,000 and four days later (the day before death) 80,000 with 40 stabs. Although he had severe sepsis and enormous quantities of sulfanilamide and was, I think, never seriously dehydrated, his hemoglobin never got below 85 nor his red cells below 4,600,000 up to his first transfusion. His temperature was unusual also. It reached 101 a few times during the first week of his illness while he had a chest infection. During the last six days of his life though he was desperately ill it never got above 99.6. In spite of all measures he gradually sank and died of exhaustion and sepsis on the twenty-third postoperative day. Cultures from the original wound and stab wounds near the advancing edge were made immediately post mortem. Both aerobic and anaerobic methods were used. Only a mildly hemolytic staphylococcus and the bacillus subtilis were recovered. Please note the absence of streptococci.

Permission for autopsy limited to examination of the abdomen was secured some hours after embalming. Copy of autopsy report:

"This is the embalmed body of a well developed and nourished white man approximately 29 years old.

"*Abdomen*: The abdominal wall is fairly flat and over the right side a brawny firmness which begins at the midline and extends toward the right side where it is quite hard. The firmness extends down to the upper part of the thigh and scrotum. There is a recent McBurney's surgical incision. The edges of this are smooth and a thin sanguineous fluid can be expressed from it. Sutures are not present.

"The abdomen is opened by an exaggerated right rectus incision. Many (embalming) trocar punches are found. All the structures and fecal material are free in the peritoneal cavity. A thick greyish gelatinous and fecal material from the embalming trocar fill the pelvis minor. The small intestine and cecum are practically empty. The peritoneum is smooth and glistening. There is a marked fibrous congested, apparently inflammatory, thickening of the head of the cecum and the terminal ileum. When these are opened the inverted stump of the appendix is found. The mucosa of the cecum about it is heavily congested and some distinct hemorrhagic areas are seen. The mucosa elsewhere is thickened, congested and edematous. No ulcerations are found.

"Sections show much fibrin, congestion and edema. In many fields there are solid sheets of erythrocytes and granular necrosis. This appears to involve all the coats. There are comparatively scant numbers of inflammatory cells and leucocytes. The leucocytes are quite sparse, however. These inflammatory cells have no particular arrangement. Toward the mucosal surface, staphylococci and large bacilli are seen.

"The subcutaneous tissues and muscles have a yellowish white and red mottled appearance. They are quite firm throughout the entire thickness.

"Sections show a more or less diffuse infiltration of erythrocytes and fibrin. Bundles of tissue, especially muscle, are isolated. Here and there are scattered groups of leucocytes. Elsewhere are bits of fibroblastic inflammatory tissue with a scant number of lymphocytes and leucocytes accompanying it. Early necrosis is common.

"The right psoas muscle is also firm and gross sections show a diffuse dark red mottled appearance.

"Sections show the structures to be similar to those of the subcutaneous tissues."

Discussion

What was the nature of this infection? Acute streptococci gangrene of the skin, the symbiotic spreading gangrene of skin and subcutaneous fat caused by a hemolytic staphylococcus and a micro-aerophilic streptococcus and the chronic ulcerative burrowing non-gangrenous lesions caused by the micro-aerophilic streptococcus alone have all been repeatedly and minutely described by Meleney and other writers. I am sure that most of this group have seen the familiar symbiotic gangrene. I have seen four cases. In 1893 Paul

Reclus of Paris reported three cases of ligneous phlegmon of the neck and several cases of this type have been reported since. In 1913 Grant of Denver reported an infection following a herniotomy that began as an induration around a linen stitch. This rapidly spread and the hardness and swelling were out of all proportion to the extent or degree of suppuration. It covered an area of three inches transversely and extended above and to the full length of the incision. The skin was dusky red. He reopened the wound through its full length and removed the stitch. The tissues were as red, hard and compact as a piece of beef. This and the unusual hardness and appearance attracted attention. There was gradual resolution and healing requiring three months. Only staphylococci were demonstrated. DaCosta mentions woody phlegmon of the abdominal wall and quotes Keen as saying that treatment has little or no effect. DaCosta says the disease is always dangerous and frequently fatal and that extirpation is rarely feasible. This is in contrast to spreading symbiotic gangrene of the abdominal wall which is confined to the skin and subcutaneous fat, does not invade the fascia and underlying muscles and can usually be controlled by cautery excision. Cases have been reported notably by Meyerding of a peculiar whitish tense edema which may or may not progress to gangrene caused by bacillus oedematiens, a subgroup of the gas gangrene series. Though there was never any gangrene and anaerobic cultures failed to demonstrate this or any other similar organism the relentless progress, the profound toxemia at the end and more particularly the invasion of the anterior abdominal and psoas muscles as well as the cecum and terminal ileum make one think of some anaerobe of the oedematiens type. Whether the sulfapyridine and sulfanilamide could have killed out or controlled the streptococci in a case that would otherwise have been frank symbiotic gangrene must be considered but the invasion of fascia, muscles and gut wall is the strongest argument against this view. I regret that I can not give a better explanation of the cause of this tragedy.

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THE DIAGNOSIS AND TREATMENT OF TRIGEMINAL NEURALGIA

With Consideration of Total and Subtotal Section of the Fifth Cranial Nerve

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PATIENTS who suffer from pain in the face are often relieved by simple and conservative methods. However, sharp, shooting, lancinating, "electric" pain usually indicates that a specific type of pain has to be dealt with and that it is caused by true neuralgia, called "trigeminal" or "trifacial neuralgia" or "tic douloureux."

Trigeminal neuralgia is the most frequent of the major types of neuralgia and is associated with typical and excruciating pain. A differential diagnosis is necessary before any kind of treatment can be instituted because in the absence of true trigeminal neuralgia neither injections of alcohol nor resection of the posterior root will produce relief. For that reason, it is necessary to distinguish between pain in the fifth cranial nerve which is the result of involvement of the nerve and pain which is not.

In arriving at a differential diagnosis it is important for the physician to keep in mind the fact that pain in the region of distribution of the fifth cranial nerve may be caused by peripheral lesions, lesions that involve the nerve trunks, lesions of the ganglia of the posterior root, lesions of the brain stem, lesions in the optic thalamus, lesions in higher associative brain centers, and migraine. Peripheral neuritis may follow trauma in which there is formation of scar tissue, pressure by fragments of bone or inflammation of nerve endings caused by local septic processes. Lesions that involve the nerve trunks may be caused by trauma to the bony canals around the nerve trunk, with subsequent formation of scar. A tumor may press on the nerve; this may occur when a malignant lesion is present in the nasopharyngeal region. Local septic processes may involve the nerve trunks and produce interstitial or parenchymatous neuritis, and lesions of the ganglia of the posterior root, such as ganglionitis, posterior poliomyelitis or herpes trigeminus, may produce pain in the distribution of the fifth cranial nerve. In addition, tumors arising from the ganglionic envelopes or other contiguous tissue may compress the ganglion. Local meningitis, caused by syphilis, nonspecific epidemic encephalitis or tabes dorsalis, may

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produce pain in this region. Numerous lesions about the brain stem, such as a tumor in the pons varolii, thrombosis, hemorrhage of the posterior or inferior cerebral artery, multiple sclerosis, and arteriosclerotic softening, may be associated with pain in this region. Possibility of the presence of lesions in the optic thalamus and higher associative brain centers, as well as of migraine, emphasizes the necessity for very careful general, as well as neurologic, examination before a definite diagnosis of one of the major types of neuralgia is made.

In the presence of trigeminal neuralgia the history is typical; usually the patient has a sharp, shooting pain that extends along the ramifications of one or more branches of the fifth cranial nerve. Usually, a "trigger zone" or area is present which, on being irritated, causes onset of the pain. Treatment consists of either the injection of alcohol deep into the peripheral branches, or the radical operation, and although results of the former procedure are not always permanent, in our experience at the Mayo Clinic it has seemed advisable for three important reasons. First, injection of alcohol aids in the making of a differential diagnosis and also confirms the diagnosis of trigeminal neuralgia if relief of pain is obtained. Although it is true that the injection of alcohol yields unsuccessful results in a small number of cases, yet, if the pain is not relieved thereby, the possibility of its being caused by true trigeminal neuralgia can almost always be ruled out. Second, the injection of alcohol is valuable in the palliative treatment of trigeminal neuralgia because it aids in the education of the patient. That is to say, injection of alcohol deep into the peripheral branches of the nerves usually is followed by relief of pain and numbness of the face, and although this particular type of anesthesia is sometimes mild and transient in duration, it serves to acquaint the patient with the sensation of numbness which will follow section or partial section of the nerve. Third, the injection of alcohol will afford temporary relief of pain to the dehydrated and emaciated patient before the radical operation is attempted, thus allowing improvement in his general condition. The duration of relief obtained following the injection of alcohol extends from nine months to many years. Injections can be repeated several times before operation becomes necessary. The ultimate and final treatment of trigeminal neuralgia is partial or complete section of the posterior root of the fifth cranial nerve. Peripheral avulsion has been done, but results following this operation are as temporary as those secured by the injection of alcohol.

There are two methods of surgical approach to the fifth cranial, or trigeminal, nerve: the transtemporal and the suboccipital. The

first type of operation is carried out through a small opening made in the skull, anterior to the ear, in the temporal region. The middle meningeal artery is ligated and the dura is reflected from over the sensory root posterior to the gasserian ganglion. With the sensory root exposed, total (fig. 1) or subtotal section can be done, and the motor root which descends behind the sensory root and supplies the muscles of mastication can be preserved.

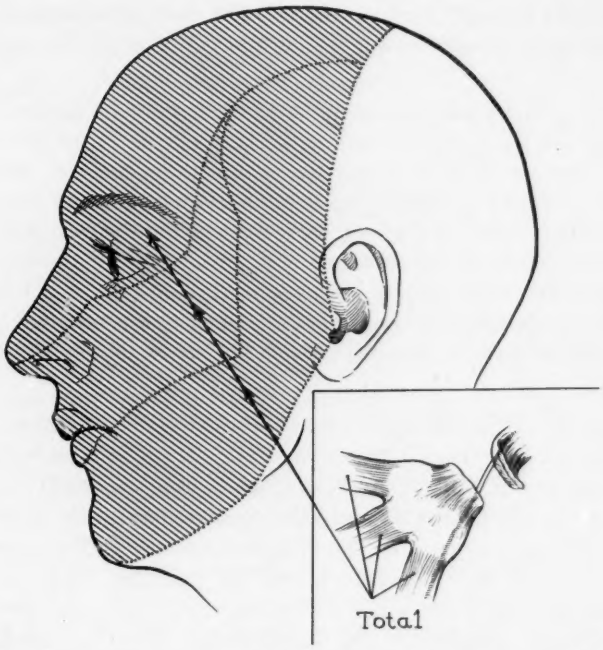

Fig. 1. Diagrammatic representation of the region of anesthesia produced by total section of the nerve.

The second type of operation is carried out through a unilateral, suboccipital opening in the skull and the nerve is exposed as it leaves the pons varolii and before it crosses the petrous bone to enter the middle fossa.

The first type of operation permits examination of the gasserian ganglion and contiguous structures for possible lesions which may be causing the pain; the second type of operation exposes the pons varolii and associated structures of the posterior fossa.

In 1884 Mears suggested removal of the gasserian ganglion for relief of the condition, and in 1886, at the suggestion of Ferrier,

Horsley and Macewen resected a single division of the sensory root. Since that time a multiplicity of surgical procedures has been developed, the aim of which has been relief of severe paroxysmal trigeminal neuralgia. The high mortality rate accompanying these procedures had dampened the enthusiasm of the surgeons until 1892, when Sir William Rose advised curettage of, and curetted, the gasserian ganglion. Cushing popularized extirpation of the gasserian ganglion, and approach to the ganglion was simplified by Hartley and Krause. Hutchinson, in 1898, first attempted to avoid the ophthalmic branch by suggesting partial resection of the ganglion.

The surgical procedures of today are based not on extirpation or curettage of the ganglion, but on section of the posterior root—that portion of the fifth cranial nerve which lies between the brain and the gasserian ganglion. Spiller[5], in 1900, made the suggestion and Frazier[5] executed the type of retrogasserian neurectomy which has been accepted as the standard basic procedure for the treatment of trigeminal neuralgia. Causation of this disease is not known, but that the ganglion is involved is indicated in the fact that permanent relief of pain is obtained only if the retroganglionic fibers are divided.

Paralysis of the muscles of mastication following section of the sensory root prompted Frazier[4] in 1919 to attempt to distinguish the motor and sensory fibers at operation, and to preserve the motor root. In 1922 Kanavel and Davis contributed to the knowledge of the anatomic aspects of the trigeminal nerve with reference to preservation of the motor root and the probable cause of facial paralysis arising from injury to the superficial petrosal nerve and the geniculate ganglion of the facial nerve. This may explain the occasional occurrence of facial paralysis. The technic of preservation of the motor root was improved in 1922 by Adson, who developed a method of more nearly accurate exposure.

One of the severe complications of the postoperative course of patients who had undergone surgical treatment for the relief of trigeminal neuralgia was anesthesia of the cornea resulting from division of the fibers to the ophthalmic branch. This condition resulted not only following removal of the ganglion, but also subsequent to total section of the nerve.

Jonathan Hutchinson, Jr. advised and carried out removal of the lower two-thirds portion of the gasserian ganglion, with preservation of the ophthalmic division and that portion of the ganglion

which subserves it. He gave as his reason for performing this procedure the observation that primary neuralgia is rare in the first division and when present is generally an overflow effect. He wished to preserve sensation in the eye, thereby preventing neuroparalytic keratitis. In 1919 he reported that he had done partial excision of the gasserian ganglion seventy times with three deaths (4 per cent).

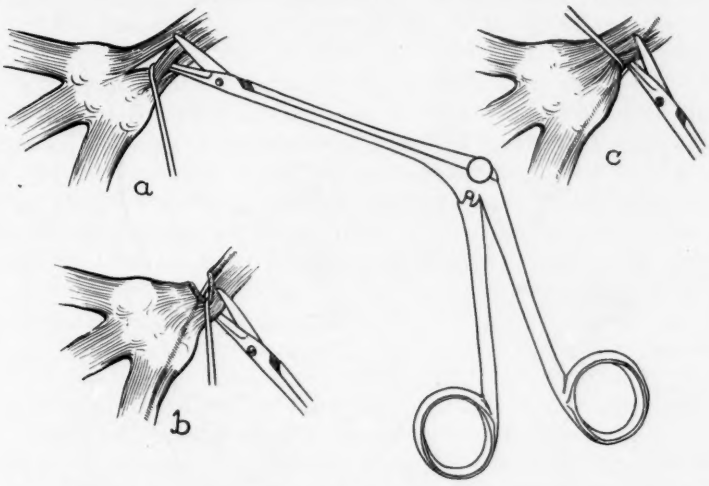

Fig. 2. Schematic version of the technic of both total and subtotal section of the sensory root by: *a*, elevation of the branches with a blunt hook; *b* and *c*, preservation of the motor root, and section with scissors.

Total division of the sensory root was considered by some as being inferior to the Hutchinson operation because of the resultant anesthesia of the cornea, although it was considered superior to the Hutchinson operation in point of mortality. Realizing this, Frazier[3] in 1925 applied the Hutchinson principle to root section, preserving those fibers in the root which supply the eye. The arrangement of fibers in the root of the trigeminal nerve allows, as Frazier has shown, subtotal resection of the fibers. There may be a slight interchange and a little interweaving of fibers, more in some individuals than in others, but in the main the fibers preserve a predestined course in the root, those to the ophthalmic division lying innermost and above, those to the third division lying below and outside, and those to the second division occupying an intermediate position. The motor root lies behind the sensory, crossing from above downward, and is free from the sensory fibers in that part of the root exposed at operation. The safest way to preserve the motor root is to cut through the root from without inward, with fine scissors, and to

elevate the fibers with a blunt hook until a hole is made through which the motor root, running in a slightly different direction, is clearly seen (fig. 2*a*, *b* and *c*). In cases in which alcohol has been injected into the ganglion or peripheral branch, fractional section

Fig. 3. Diagrammatic representation of the region involved in subtotal section of the fibers of the sensory root (maxillary division).

may be much more difficult to carry out, for there may be many adhesions which make it difficult to separate the fibers. Even though a portion of the sensory fibers to the cornea is divided, Jefferson has shown that as much as a half of the cornea can be anesthetized without danger of production of neuroparalytic keratitis.

Frazier[3, 4] established anatomic divisions of the ganglion and sensory root on the basis of embryologic development. He stated that the ophthalmic division of the trigeminal nerve is phylogenetically older than the other two divisions, and that it is therefore much more resistant to pain, because phylogenetically new tissue is more susceptible to adverse conditions. Frazier quoted Whitehead, who found that the ophthalmic portion is more precocious in its development. The cells in this region develop fiber processes earlier

and the cells become arranged in clusters sooner than do the cells of other regions.

Study of the development of the sensory root and gasserian ganglion in the fetus has shown that the sensory root is composed of three separate and distinct bundles, one for each of the three portions of the ganglion: the ophthalmic, maxillary and mandibular. The motor root, as it passes behind the ganglion, receives fibers from the ganglion. In the development of the ganglion, the ophthalmic portion exhibits a certain extent of isolation from the other two portions, as if nature had intended some differentiation in function to exist, just as in certain lower forms of animal life an entirely separate and distinct ganglion exists for the ophthalmic distribution. A free intermingling of the fibers given off from the middle and outer portions of the ganglion to the maxillary and mandibular divisions was found. In these embryologic features an explanation was found for the more frequent association of pain in the maxillary and mandibular divisions, and the infrequent association of pain in the ophthalmic division, with pain in the other two divisions. Frazier, in advocating subtotal section of the sensory root, stated that he was firmly convinced that if pain is controlled or arrested in the zone in which the paroxysm is initiated, such control or arrest will be all-sufficient (fig. 3). In some cases he divided only that portion of the root which supplies the zone of initial paroxysm. He advocated this procedure because the patient suffering from true trigeminal neuralgia is very willing to exchange numbness for pain, although the numbness will in some cases be a source of considerable annoyance. Efforts should be directed toward keeping the zone of anesthesia as small as possible.

Klemme, to localize more nearly accurately the fibers of the posterior root which traverse the gasserian ganglion and supply the ophthalmic division of the fifth cranial nerve, has advised and carried out a procedure which he reported as being satisfactory. After he had approached the ganglion and posterior root in the usual manner (transtemporally) he dissected the dura propria from over the ganglion and exposed the maxillary and mandibular divisions as they leave the ganglion. He incised the dura arachnoid at the junction of the maxillary and the ophthalmic divisions and carried the incision posteriorly across the ganglion and sensory root. He next inserted a fine nerve spatula between the bundles of fibers leading to the ophthalmic and maxillary branches, carrying the spatula back gently through the ganglion into the posterior root. Klemme then sectioned the fibers in the posterior root below the spatula. It

was said that in this manner all the fibers to the ophthalmic division could be preserved and that anesthesia of the cornea did not occur.

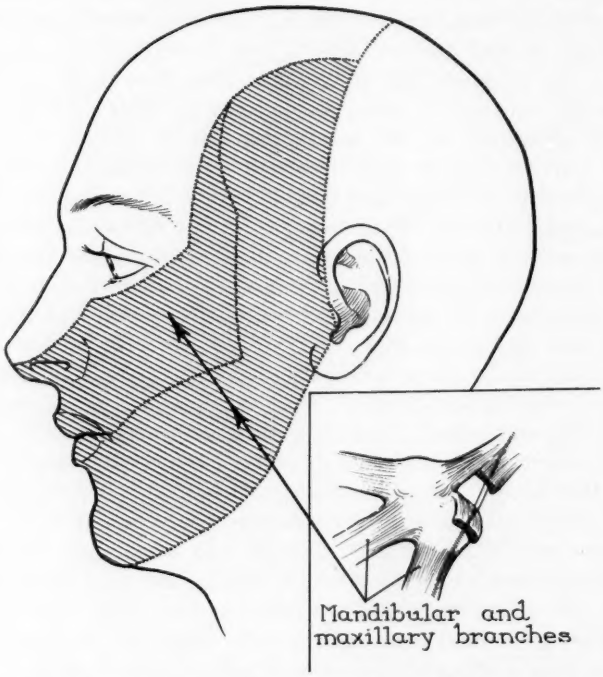

Fig. 4. Diagrammatic representation of the region involved by subtotal section of the sensory root (mandibular and maxillary divisions).

Grant, in reporting a series of cases, stated that true major trigeminal pain recurred fifty-one times, or 5.3 per cent; it recurred seven times, or 2 per cent, in 359 cases of complete division of the sensory root and forty-four times, or 7.4 per cent, among 590 patients who had undergone partial section. In the forty-four cases in which pain recurred after partial section, it was situated in the first division in forty instances, in the third division in three, and in the first and third divisions in one instance. In the forty cases in which pain recurred in the first division, the fibers running to that division were deliberately spared to preserve the corneal reflex and to prevent keratitis. In thirty of these cases the patients subsequently were relieved by supra-orbital avulsion; in five, by reoperation and complete severance of the sensory root. The four cases of recurrence in the third division or first and third divisions represented instances in which the original pain had occurred entirely in

the second division, and in which only the middle third portion of the root had been severed. The patients were relieved by reoperation and complete root section. In the forty-four cases of incomplete ablation of the sensory root, recurrence occurred on an average of four years postoperatively.

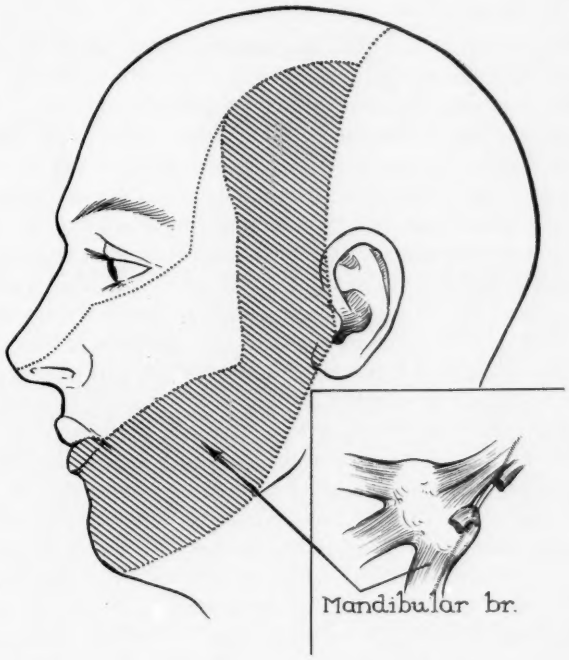

Fig. 5. Diagrammatic representation of the region involved in subtotal section of the fibers of the sensory root (mandibular division).

Thus far, this paper has been concerned chiefly with the development of surgical relief of trigeminal neuralgia, in which the ultimate goal seems to be subtotal section of the nerve situated between the gasserian ganglion and the brain. It has been shown that this is possible anatomically, provided that no adhesions of the nerve fibers are present and that by sparing of the fibers which continue into the first (or ophthalmic) branch, postoperative complications resulting from an anesthetic cornea can be prevented (figs. 4 and 5). However, when subtotal section is carried out, the surgeon cannot promise the patient that he or she will never experience more of the same type of pain, and many patients wish such reassurance.

Granted that subtotal section is the operation of choice, there are factors which interfere with the possibility of section of the pain-carrying fibers, and these factors can make total section of the nerve a necessity for the relief of pain. Also, certain precautionary measures have been developed which reduce the danger of corneal and conjunctival complications and minimize the hazards of complications in the region of the eyes.

For many years it has been the custom at the Mayo Clinic to fit the operation to the patient, and only for young individuals or those for whom certain occupations make an anesthetic cornea a hazard is subtotal section performed. For older individuals especially, when there has been some extent of involvement of the first branch, it has seemed more important completely to relieve the pain and to assure the patient that never more will he be subject to the pain, than to attempt to preserve the sensation of the first branch. It has long been known that the sympathetic fibers from the carotid sympathetic plexus join the gasserian ganglion distal to the operative site and that they are carried out over the ophthalmic branch to the cornea. Avoidance of trauma to the upper portion of the ganglion has been followed by almost complete absence of keratitis in the cornea of patients for whom total section has been carried out. Protection of the patient's eye during operation by the sealing of the lids with adhesive tape, the use of a large watch crystal, or Buller's shield during the period of hospitalization and the patient's wearing of light transparent shields attached to spectacles following the operation and institution of daily irrigations of solution of boric acid, have almost eliminated the complication so greatly feared in the early stages of surgical operation for trigeminal neuralgia.

A recent review of 434 cases in which operation was done during a ten-year period reveals an incidence of conjunctivitis of seven cases and an incidence of corneal abrasion of five cases. During the same period there were only thirteen instances of recurrence which required reoperation for relief. In the treatment of conjunctival and corneal irritation, the use of harsh antiseptic agents has been found to increase the irritation, and a solution of epinephrine (1:1000) instilled frequently has proved to be of the greatest value in clearing up congestion.

Preservation of the motor root, which prevents atrophy of the muscles of mastication, has been carefully adhered to and in very few cases in our series has this measure been technically impossible. In one case of recurrence of pain in the first division and paresthesia over the entire face, a small neuroma was found at the second operation (fig. 6*a*, *b* and *c*). This neuroma involved not only

the cut ends of the second and third divisions, but seemed also to involve the intact fibers to the first division. Complete relief followed total section.

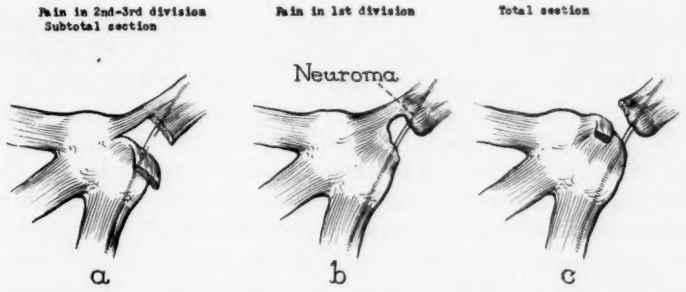

Fig. 6. Schematic representation of *a*, origin of pain in the second and third divisions of the fifth cranial nerve relieved by subtotal section; *b*, origin of pain in the first division with a neuroma which involved the central portion of the nerve and was associated with paresthesia; *c*, technic of total section of the nerve which brought patient relief.

To say that subtotal section should be carried out in all cases seems to omit consideration of the possibility of recurrence of pain, the technical difficulties frequently encountered in dissection of the fibers, and the infrequent occurrence of the postoperative complication of anesthetic cornea due to improvement in technic of operation and postoperative care.

Although it is true that Hutchinson's observations concerning the infrequency of involvement of the first division are correct, we at the clinic found that in 37 per cent of our cases, the patients complained of pain in this region. Data concerning the second division, in which an 85 per cent incidence of involvement was noted, and the third division, in which a 70 per cent incidence of involvement was noted, further bear out Frazier's contention.

It was of additional interest to note that in our series of 3,427 cases in which the patient's condition was diagnosed as trigeminal neuralgia, 2,028 patients were treated surgically and 1,270 received injections of alcohol. These figures represent simply the number of patients seen and the treatment advised. Many of the patients for whom injection of alcohol was carried out were subsequently operated on elsewhere, and many of the patients who were operated on in the clinic had obtained palliative relief from the injection of alcohol elsewhere.

To obtain information concerning recurrence and incidence of pain on the right and left sides as well as mortality rates, 944 cases

in which treatment had been surgical were carefully reviewed. The right side was involved in 616 cases, whereas pain on the left side occurred in 328 cases, or about a half as frequently as on the right side. Bilateral trigeminal neuralgia occurred in nineteen cases.

One of the frequent questions which the patients ask is whether or not pain will recur following the operation. If total section is carried out, the original pain should never recur. However, statements should be made guardedly when a prediction is made as to the presence of paresthesia postoperatively. Recurrence has been noted after performance of subtotal or partial section. In our series recurrence had occurred thirteen times, and in every case a subtotal type of operation had been carried out. Therefore, when the subtotal operation is done, the patients should know that pain may recur in that branch which has been left intact. Should the ophthalmic division be preserved and pain subsequently occur, avulsion of the supra-orbital nerve may afford relief. In some cases the nerve must be sectioned intracranially. The mortality rate which accompanies operation for the relief of trigeminal neuralgia is remarkably low, and it is considered that the majority of patients operated on are in the fifth, sixth, or seventh decade of life. At the clinic we have been able to avoid the occurrence of death from operation for a period of four consecutive years. In the entire group of cases the mortality rate is 1.9 per cent, and in every case, before operation, it was realized that the risk was the result of constitutional disorders and advanced age of the patient. During the past few years the mortality rate has been reduced to less than 1 per cent because of improvement in technic and preoperative and postoperative care, and because of the fact that patients are being operated on in the earlier stages of the disease before their general condition has become serious.

At the clinic, whenever question exists as to the necessity for total section, we do not hesitate to carry it out. The recurrence of pain and the necessity for reoperation during convalescence to relieve residual pain in the first division, when subtotal section has been carried out, have impressed us with the necessity for adequate section of the nerve. Following, as we do, the plan of injection of alcohol to acquaint the patient with the sensation of numbness before division of the nerve is done, we have experienced little difficulty in impressing the patient with the necessity for exchanging numbness for pain.

There are advantages and disadvantages in both total and subtotal section of the sensory root, and like most other surgical procedures, the objective is the same, namely, satisfactory relief of

pain. Both procedures have value and utility. When it is possible to perform it, subtotal section is ideal if only the second and third branches are involved, and if the procedure will relieve the pain completely. But when it is inadequate, or when dissection of the nerve is technically impossible, total section can be carried out with a mortality rate that is no higher than that which accompanies subtotal resection, and, by observance of a few precautions, it can be done with minimal danger of the occurrence of neuroparalytic keratitis, a condition which has proved to be so distressing in the past.

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THE PERINEAL-ABDOMINAL OPERATION FOR CANCER OF THE RECTUM

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WE ARE still trying to explain the increase of cancer of the rectum, as well as cancer elsewhere. Of course, it may be due entirely to a longer span of life which places a higher percent of the population in the cancer age; or again, the explanation may not have been found. The evolution in the surgical procedures for its cure have occurred rapidly. Fifty years ago the Kraske operation was as spectacular as, and more hazardous than, pneumonectomy is today. Dr. A. C. Scott a few years ago recited an interesting story illustrating the history of progress in rectal cancer surgery. In about 1890 Dr. B. E. Hadra, who was Professor of Surgery in the old Texas Medical College, had performed nine Kraske operations for cancer of the rectum and published a report of these operations. Dr. Nicholas Senn of Chicago came to Texas and went with Dr. Scott to see Hadra who exhibited his pathologic specimens which were carefully kept in fruit jars. A long discussion occurred between the two surgeons, most of which was in German which Dr. Scott did not understand. Before leaving, Dr. Scott, a very young man, entered the discussion and tactlessly asked how the patients got along, and Dr. Hadra replied that they had all died.

The study of the spread of the disease which has meant the study of lymphatics and lymphatic drainage, has influenced the changes in procedures. The most recent studies by Gilchrist and David have further emphasized the futility of any operation that does not have as its object the extensive removal of lymphatics. In a series of studies of specimens removed by the more extensive procedures, by a special method the specimens were cleared to reveal the lymphatic glands and they have found 20 to 80 lymph nodes per specimen. They also found isolated involved nodes far above the tumor with uninvolved glands intervening, emphasizing further the importance of the radical procedures. At the present time the extensive removal of lymphatic-bearing tissue and a reduction of mortality has been the goal of rectal cancer surgery.

Broders' pathologic grading of tumors has been of value in arriving at a more accurate prognosis, but should not be used to determine the extent of the operative procedure. Even growths of

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low malignancy do metastasize and the treatment should be equally as radical for these as for higher grades of malignancy.

The location of the cancer, whether the flat-celled types arising from the anal canal, or the adenocarcinoma arising from crypts or the glands of Lieberkuehn, should make little difference in the operative procedure. It is true that in the first group lymphatic drainage, particularly in the male, is chiefly to the inguinal glands, but not wholly so. In a few old people I have been content to do the perineal (Lockhart-Mummery) type of operation. Though the operative mortality may be lower from this procedure, I have become more inclined to the more radical procedure in all patients, even with the less favorable risks, since the operative mortality has reached a very low figure. And again, anterior-position colostomy is unquestionably much preferable, and in the female, perineal hernia is much more likely to occur with the anal position.

It is not within the scope of this paper to review or discuss the various operations which are now advocated by a number of men who have had a rich experience with rectal cancer. Based upon the Miles radical procedure many variations have been practiced by Rankin, Jones and others. The choice of one or two stage procedures is to be decided by the surgeon and both have their advocates. It has been said that any surgeon who operates on patients for carcinoma of the rectum should have at his command a number of procedures and select the operation which seems wisest in each case. Such a rule is sound advice, but for the surgeon who will operate upon only an average number of cases, becoming proficient in many procedures is quite unlikely; therefore, it seems wise to confine one's self to one or two procedures wherever possible. For a number of years I tried one procedure and then another as advocated by one surgeon and then another with considerable confusion and indecision as to which procedure was best. Since 1930 an operation which was first called to my attention by Dr. Willard Bartlett has been almost exclusively used.[1] Priority for this operation is also claimed by others. It is not for me to say who should be given credit for it. It is the one stage perineo-abdominal operation.

The criticisms which may be offered against it are:

(1) an opportunity is not afforded to examine the liver for metastases.

(2) adequate cleansing of the lower bowel before operation is difficult and

[1]Read by Dr. Bartlett before Texas Surgical Society, Feb. 1930 and published in Archives of Surgery, May, 1931.

(3) troublesome ileus is likely to follow because the colostomy has not developed function before the resection as it does in a preliminary colostomy.

To the first of these one can answer that liver metastasis is not a contraindication to resection since the patient will live longer and in greater comfort after resection, even though metastasis has occurred to the liver.

Secondly—a dry and empty bowel is an advantage, but with a careful technic the danger of opening the bowel and soiling is not likely and has not happened in my experience.

Thirdly—with gastric suction postoperatively until peristalsis is restored (3 or 4 days) the danger of annoyance from ileus is eliminated. Also the gaseous distention which may endanger the sutured pelvic peritoneal floor is prevented. This practice has made this complication to the convalescence of these patients no longer expected or dreaded.

I recommend this operation because it is technically much easier, more rapid in performance, the work to be done intra-abdominally is very little and requires a very short time. In this procedure there is a minimum of handling of the intestines with less shock and less likelihood of peritonitis and wound infection. By the use of one procedure repeatedly one becomes more expert in its performance.

CANCER OF THE RECTUM 1930-40.

Inoperable	37	
Palliative operation	17	
Operable	30	(45%)
Perineal Excision	6	
Perineo-Abdominal	24	
Total	67	

PERINEO-ABDOMINAL RESECTION 1930-40.

Operative Deaths	2	(8.3%)
Died From Recurrence (1-4 years)	5	
Living and Well (1-10 years)	17	
Total	24	

I have had two deaths following operation. The cause of death in the case of a very excitable man, 65 years of age, which occurred 3 days following operation, was not explained by autopsy. He complained hysterically of pain in spite of large doses of opium and we attributed death to shock. The other death was in a woman 50 years of age and a very favorable case. This was ten years ago before the routine use of postoperative gastric suction in abdominal surgical patients. Ileus developed, accompanied by great disten-

tion. Too late we recognized that she had a mechanical obstruction. An enterostomy was done but death occurred on the eighth day and the autopsy revealed a herniation of the intestine through the perineum. With our present postoperative treatment this patient would have lived. Since that accident we have practiced careful suturing of the uterus back over the perineal sutures which will prevent primary or secondary herniation.

Operative Technic

I prefer general anesthesia. A No. 16 sized Levin duodenal tube is passed before the anesthetic is begun and is not removed for the first 3 or 4 days. The patient is placed face down upon the table with the foot and head lowered. Following a thorough scrubbing of the genitalia and anal region with soap and water, a catheter is placed in the bladder. A yard strip of dry gauze is forced into the rectum and the anus securely closed by suture. The gauze outlines the rectum facilitating dissection, and at the same time absorbs moisture from within the bowel. An incision is made from above the coccyx vertically down and around the anus. The coccyx is removed. The fascia propria is identified and incised. The levator ani is cut wide laterally. The rectum is dissected free to the peritoneum where it is opened anteriorly. With the peritoneal cavity reached one can easily liberate the rectum still higher. The rectum is now placed in a new sterile glove and pushed well into the peritoneal cavity. The peritoneum is partially closed, the suture is rolled on a piece of gauze and placed into the abdomen. A large rubber covered strip of iodoform gauze is placed in the space from which the rectum was removed and brought out at the site of the anal opening. The wound is then closed loosely with interrupted sutures.

The patient is turned over, placed in the Trendelenburg position, and prepared for laparotomy. A midline incision is made and the gloved rectum is recovered and brought out of the abdomen. The complete liberation of the rectum and lower sigmoid is completed and the previously started suture of the peritoneum is completed. In the female the uterus is sutured back over the peritoneal suture. The colostomy may be made in the left side by a small muscle splitting incision or made in the midline incision after the practice of Tom Jones. Large heavy clamps are placed on the colon and the colon burned across with the cautery. If the bowel is to be brought through a stab-wound on the left, one clamp is passed through the incision before clamping the bowel, and brought out through the left wound after the bowel is severed with the cautery. This clamp is left on the bowel for from 48 to 72 hours.

NON-PARASITIC CYSTS OF THE SPLEEN

Report of a Case

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and
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NON-PARASITIC cystic disease of the spleen occurs relatively infrequently but, when encountered, it presents diagnostic problems sufficiently difficult to justify the report of the following case. No other case has been encountered at the Medical College of Virginia Hospitals, and only 108 have been reported in the literature.

Report of Case

V. B., a colored girl, age 14 years, was admitted to the medical service on Sept. 5, 1939, with a history of being perfectly well until ten days prior to admission, when she experienced sharp pain, localized in the left upper quadrant of the abdomen. Several days after the onset of the pain she noticed a mass in this area. She had no gastrointestinal symptoms other than anorexia. There had been a moderate degree of dyspnea. No urinary symptoms had developed.

The patient had had whooping cough, measles, mumps, and chicken pox in childhood. Her menses had not begun. There had been no injury to the abdomen.

There was no history of familial or hereditary disease.

The patient was a well developed colored girl, lying comfortably in bed. The temperature was 100.6, pulse 120, respiration 18. Blood pressure was 115/80. Positive findings were limited to the chest and abdomen. The left costal margin flared outward, and there was a lag on respiration. The diaphragm was high on the left, and did not descend well with inspiration. The percussion note was dull below the seventh left intercostal space in the anterior axillary line. The heart was normal. The abdomen was prominent in the left upper quadrant. A large, smooth, semi-cystic mass was present in the left upper quadrant. It extended upward beneath the costal margin and downward to the level of the umbilicus. The mass moved with respiration, and no notch could be palpated. The liver was not enlarged.

The hemoglobin was 75 per cent, and the red cell count was 3,880,000. The white cell count was 4,750. The differential count was normal; 75 polymorphonuclears, 21 lymphocytes, 2 eosinophils, and 2 mononuclears. Blood chemistry showed nonprotein nitrogen 26, sugar 85, total protein 6.7. The Wassermann reaction of the blood was negative. The mass was aspirated by the medical service, and a small amount of brownish fluid was obtained. The non-protein nitrogen of the aspirated fluid was 39.4 mg. per hundred cubic centimeters.

Roentgen Examinations: In the left upper quadrant, there was density which could represent the spleen or the left kidney. An intravenous pyelogram showed constant filling defects in the upper calyx of the left kidney.

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Gastrointestinal series showed the stomach to be displaced to the right of the midline. The greater curvature of the stomach was distorted by an external mass, but there was no intrinsic defect of the stomach. The splenic flexure of the colon was depressed by a large mass in the left upper quadrant. No intrinsic defects were noted in the colon.

Fig. 1. Roentgenogram following barium meal showing displacement of stomach to the right of midline and distortion of greater curvature by splenic cyst.

On September 19, the patient was transferred to the surgical service. On the basis of the x-ray findings, a preoperative diagnosis of probable cyst of the spleen was made.

OPERATION: On September 22, a curved left subcostal incision was made. On opening the peritoneal cavity, a spherical, purplish mass presented, which resembled spleen. Further examination showed a large cyst arising posteriorly from the spleen, and this had flattened out the spleen anteriorly on its surface. There were numerous light adhesions between the spleen and the subdiaphragmatic region, stomach, colon, and liver. These were separated without difficulty, and the tumor was brought out on the abdomen. While clamping the pedicle, a tear was made in the cyst, and about 500 c.c. of straw-colored fluid escaped. One liter of fluid was aspirated from the cyst. After multiple ligations of the pedicle, the spleen and the cyst were removed. There was practically no bleeding, and hot packs controlled the slight oozing. The incision was closed in layers without drainage. A transfusion of 300 c.c. of blood was given after the operation. Two days postoperative, the hemoglobin

(Sahli) was 83 per cent; the red cell count 4,710,000; the white cell count 18,250. Nine days postoperative the hemoglobin was 91 per cent. The red cells numbered 5,820,000 and the white cells 15,150.

Fluid from the cyst was negative for echinococci, and the complement fixation test was also negative.

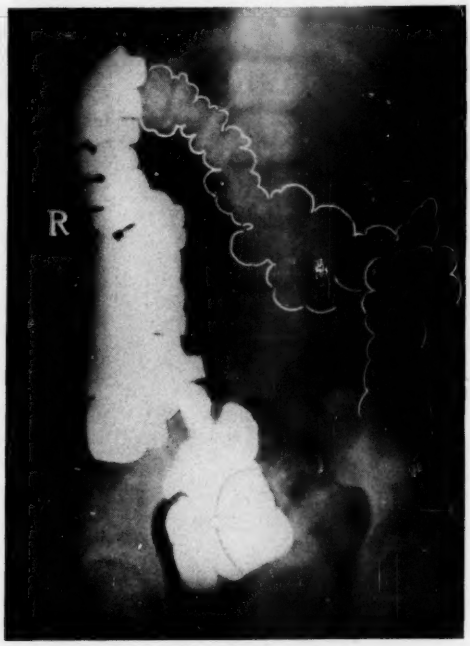

Fig. 2. Roentgenogram of colon following barium meal (retouched). The splenic flexure is depressed by the splenic cyst.

The convalescence was uneventful, and the patient was discharged from the hospital sixteen days after operation.

PATHOLOGIC REPORT: The spleen measured 12 by 15 by 8 cm. It was flattened out on the anterior surface which was purple, firm and homogeneous. On the posterior surface was a large cyst, 8 by 12 by 6 cm. in size, with a thin wall except where the splenic tissue made up part of the wall. The internal wall of the cyst was made up of irregularly placed trabeculae. The cyst capsule was thin, translucent and fibrous.

Examination of sections taken from various portions of the cyst wall and the spleen disclosed no remarkable changes of the spleen, its capsule or the splenic pulp and sinusoids. In some portions the pulp was prominent, and the sinusoids were almost entirely collapsed, but in others the structure appeared more usual. The splenic capsule consisted of hyalinized connective tissue of varying thickness, becoming somewhat thinner over the cyst part. The inner wall of the cyst was lined by a layer of cells which had oval and round nuclei

containing homogeneous chromatin material and cells, the cytoplasm of which was not remarkable, but uniformly finely granular or vacuolated and pale gray. These cells cytologically were identical with the serosal cells of the peritoneum. In many areas they were piled up two or three cell layers thick, and occasionally they formed small papillary projections into the lumen of the cyst. In areas related directly to the splenic pulp, there were numerous thin-walled multilocular structures, the intervening wall being composed of splenic pulp lined on either side by a similar row of partly phagocytic serosal cells. No inflammatory changes nor dilated vascular structures of any type were seen.

PATHOLOGIC DIAGNOSIS: Benign cyst of spleen, lined by cells identical with peritoneal cells. This probably represents a development peritoneal inclusion cyst of the spleen.

Cysts of the spleen are usually divided into three classes.

1. Dermoid cysts of the spleen, which are rare: only six have been reported in the literature to 1938.

2. Echinococcus cysts, which are more common.

3. Non-parasitic cyst, of which our case is an example. Benton[1] in reviewing the literature collected 96 cases to 1932. Twelve more cases have been reported in the literature since 1932.[2, 3, 4, 5, 6, 7.]

Sixty-five per cent are said to occur in females, and these usually fall between the ages of 20 and 50. However, cysts of the spleen have been reported in children and infants.

Exclusive of dermoid and parasitic types, splenic cysts are classified by Fowler[8] on an etiologic basis as follows:

I. TRUE CYSTS:

1. *Infoliation cysts:* inclusion of peritoneum; inflammatory or traumatic; small and multiple; superficial or deep; malarial and leishmaniasis.

2. *Dilatation cysts:* polycystic disease of the spleen; the entire parenchyma studded; rare ectasia of the splenic sinuses.

3. *Neoplastic cysts:* lymphangioma; hemiangioma; sarcomatous metastases. Differentiation from inflammatory types may be difficult.

II. PSEUDOCYSTS (secondary):

1. *Traumatic:* origin usually from a hematoma; usually large and unilocular; contents serous and hemorrhagic.

2. *Degeneration:* arising from secondary changes in infarcted areas from arterial degeneration or occlusion of blood vessels by emboli with subsequent necrosis of splenic pulp; usually solitary and large.

According to Sherwin, Brown and Liber,[7] non-parasitic cystic disease may present four morphologic types:

a. A large solitary cyst; (contents usually hemorrhagic.)

b. Numerous very small cystic cavities, usually subcapsular or projecting from the capsule. These are the most usual type.

c. The so-called multiple or polycystic spleen in which the entire parenchyma is studded.

d. One large cystic cavity involving only part of the parenchyma, which is well preserved, with numerous small cystic satellites.

The symptoms occasioned by these cysts may be explained on the basis of compression of adjacent viscera and dragging from the weight of the splenic mass. Pressure on the left kidney with filling defect of the calyces on roentgenologic examination may present confusing findings suggestive of a urinary tract lesion, as in our case.

Roentgen study is usually of great diagnostic aid, showing the stomach to be displaced to the right of the midline, and the splenic flexure to be displaced downward. Ostro and Makover[2] and Benton[1] call attention to these findings. Benton feels that downward displacement of the splenic flexure is almost pathognomonic of a large cyst of the spleen. A correct diagnosis is rarely made prior to operation, and we feel that the roentgenologic examination was the determining factor in making the correct diagnosis in our case.

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DIRECT X-IRRADIATION OF TUMORS

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FOR TOO LONG, the roentgen and radium therapist has occupied a place in the twilight zone between medicine and surgery. On the one hand, he is not by training or inclination a surgeon, and neither is he concerned with the cure of disease by drugs or diet. Cases which do not respond to medication and those which are not amenable to surgical excision are referred to him; and usually he has to solve the problem alone. It would be advantageous to physician and patient alike for a closer cooperation to be developed. The most natural association would seem to be that of radiologist and surgeon, in-so-far as the lesions are technically, if not actually, surgical in nature. The recent development of direct x-irradiation of tumors has necessitated such an arrangement. This preliminary report is offered, therefore, not only to advocate this type of treatment (not original with us), but also to illustrate the advantages of such cooperation.

Irradiation is particularly selective in its action in that neoplastic tissue is usually affected by a smaller amount than is normal tissue. However, if it cannot be applied directly to the lesion, its dosage will be limited in its effects by the thickness of the normal tissue it must penetrate to reach the pathologic. This explains the advantages radium has possessed in the treatment of carcinoma of the cervix or interior of the bladder. While it is generally accepted that there are degrees of radio-sensitivity, it is possible that some of the so-called radio-resistant lesions are resistant in part because of their inaccessibility. X-irradiation is safer and may be considered more easily controlled than radium emanation provided that it can be applied directly to the lesion. The primary rays of x-irradiation are spread evenly and with a greater depth dose than can possibly be obtained with radium implants or seeds which furnish areas a necrosis interspaced with under-exposure and overlapping three dimensional zones. The beam is easy to control, since the primary irradiation is constantly in one direction and secondary rays may be quickly absorbed. The use of a sterile cannula and an obturator cone for the tube and the periscopic cones has made such treatment possible; but in most instances a surgeon is required to expose the lesion properly. When the lesion is exposed, the most effective type of x-irradiation is that of direct low voltage x-ray therapy. The

term "low voltage" as used here should be accepted as a descriptive one; actually, the voltage may be varied as the need demands, for example: 80-120 PKV.

The range of applicability would seem to be very wide. Metastatic axillary nodes, brain tumors and intraperitoneal lesions should be as susceptible to this type of irradiation as the following cases which were treated as St. Joseph Infirmary.

CASE 1. O. S., a man 43 years of age, complained of passing blood in his urine on several occasions in the preceding two months. There had been no pain, frequency or urgency. Cystoscopic examination showed a papilloma with a short pedicle and broad base below and medial to the right ureteral orifice. The usual treatment would have been fulguration with probably the implantation of radon seeds because of the broad base; and an annoying persistent cystitis would have been anticipated. The so-called "deep x-ray" by cross-firing the bladder would not have been feasible.

In this case, the patient was cystoscoped, and a catheter placed in the right ureter. A suprapubic cystostomy was then done, the papilloma excised and its base fulgurated. With the patient still under spinal anesthesia, the sterile cannula was placed accurately through the wound down to the fulgurated area, and the patient transported to the x-ray therapy room. The 3 cm. obturator cone of the x-ray tube was placed within this sheath and 3200 r units of low voltage x-ray was given directly to the lesion from a distance of 10 inches. Technic: 120 KV; 7.5 MA; 1 aluminum was employed. The therapy required approximately 35 minutes. The bladder was then sutured around a drainage tube and the overlying tissues closed in the usual manner. There was no delay in the closure of the suprapubic sinus and there was no symptoms of an irradiation cystitis. The periscopic arrangement on the cone allows the therapist the assurance of accurate placement.

CASE 2. J. E., a man 69 years of age, complained of a growth on his penis of four years' duration. It followed trauma to his penis: it began as a small ulcerated area after the swelling and discoloration subsided. Examination showed a proliferating and ulcerative type of infiltration of the prepuce which was adherent to the glans. A frozen section biopsy was reported as malignant. In the right femoral and inguinal region indurated glands were palpable.

A curved incision was made from one anterior superior spine to the other and the skin flaps dissected upward and downward. Inguinal and femoral glands and gland-bearing tissue excised. The penis was sufficiently long to permit partial amputation well behind the involved area and leave a satisfactory stump. This was sutured in the usual manner and the patient was then transported to the x-ray therapy department. With the skin edges retracted and using sterile cannula, x-irradiation was applied through two portals, each inguinal and each femoral area given a total of 3400 r units at a distance of 10 inches; using 120 KV; 7.5 MA; 1 aluminum; 8 cm. diameter cone. The therapy time required approximately 1 hour. The skin edges were then sutured and a drain brought through a stab wound on each side. Healing was entirely satisfactory, the overlying skin showing no evidence of the irradiation.

CASE 3. W. B., a man 61 years of age, a Cancer Clinic patient, gave the following history: Three years previously, he had had a proven carcinoma of the floor of the mouth. It was treated with radium and deep x-ray and

had remained healed. Enlarged cervical glands responded well to the usual deep x-ray through the overlying skin. The presenting complaint was a painful indurated mass in the right side of the neck beneath and fixed to the sternomastoid muscle; and the appearance of the overlying skin would indicate that it had received the maximum irradiation it would tolerate. A crucial incision was made over this mass and the muscle sectioned by the Resident Surgeon under our supervision, and as much of the tumor as could be removed was excised. This, we believe, is one of the great advantages of direct irradiation—not only can the maximum dose be given, but it is given to the minimum amount of malignant tissue. The three skin flaps were retracted so that x-irradiation could be applied without penetrating the skin. Accordingly, he was given 3600 r units. Technic: 120 KV; 7.5 MA; 10 ASD; 1 aluminum.

The healing of the skin edges was amazingly rapid and complete. Subsequently, the same type of treatment was given on the left side of the neck for a later metastasis and the same irradiation employed.

Cases of other surgeons have been similarly treated. The lesions included among them are: mixed tumor of the parotid and carcinoma of the thyroid, and cancer of the prostate.

While it is too early to evaluate the benefit of such therapy, we share the optimism of others who have advocated it. Certainly, the increased irradiation which can be safely given will accomplish more than the good results that have previously been attained by irradiation through the intact skin overlying tissue.

Conclusions

1. It is our firm conviction that better results in tumor treatment will be achieved by closer cooperation between the surgeon and radiotherapist.

2. The peculiar advantages of x-irradiation can be best utilized by incision and retraction of the overlying tissues, permitting direct irradiation of the lesion.

3. Such massive treatments will not affect healing after subsequent suture of the skin.

4. We believe that the originators of this type of treatment have made an epochal contribution to the management of tumors and of their metastases.

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STERILITY RELIEVED BY LEFT SALPINGOSTOMY FOLLOWING RIGHT SALPINGO-OOPHORECTOMY

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MANY members of the profession are consulted almost every day by women seeking examination and treatment to overcome sterility. When the tubes are found closed, these patients are usually told that operation offers little or no prospect of correction of their trouble and are advised against such a procedure. The following case is interesting in that it presents striking evidence against the theory that surgical release of tubal strictures is practically futile as a means of promoting pregnancy.

REPORT OF CASE

Mrs. T. came on Aug. 20, 1939 for examination because of sterility and a desire to have the condition corrected. Her right tube and ovary had been removed eight years previously on account of a chronic oophoritis and salpingitis. Since that time her menses had been regular but scant, and during the three months prior to her visit she had taken estrogenic preparations to stimulate menstruation. She had been given two Rubin tests, two and three years earlier, and on both occasions the tube was found closed. Aside from these events, her history was essentially negative.

The patient was well developed, and presented no evidence of abnormality other than a slight tenderness over the left adnexal region. The uterus was firm and in good position, and no masses were palpated. The Wassermann reaction was negative, and no Neisserian organisms were found in the cervical secretions. A Rubin test was again carried out in an effort to determine the patency of the tube; no air entered the peritoneal cavity even under high pressure. It was therefore concluded that the tube was constricted and that this was probably the cause of the patient's failure to conceive.

Although warned that operation for relief of tubal obstruction is followed by pregnancy in only a small percentage of cases, the patient stated that she wished, nevertheless, to have the tube opened that she might have even this remote chance of becoming pregnant. Accordingly, laparotomy was carried out, at which time a constriction ring and area of stenosis was found in the middle portion of the left tube. The uterus and left ovary appeared normal. A sound was inserted into the fimbriated end of the tube and passed through the stenosed area, and the tube was incised longitudinally over the sound at this point for a distance of 1 centimeter. The incision was then sutured transversely after the principle of Heinecke-Mikulicz in pyloroplasty, producing an enlargement of the lumen, interrupted stitches of fine catgut being used. The tube was found to be amply patent after this procedure, and the abdomen was closed in the usual manner. The patient's convalescence proceeded smoothly, and she was dismissed from the hospital on the tenth postoperative day, with instructions to take tablets of ephynal acetate (vitamin E) for a few months. Two weeks later, however, the stricture had apparently recurred, as another attempt to force air through the tube was successful only

upon the application of high pressure. The operation seemed to have been of no avail.

On July 10, 1940, the patient returned, stating, to our surprise, that she had become pregnant during the previous May. She was examined regularly thereafter, and her pregnancy continued without difficulty through the fifth month, until November 2. At that time, she began to have a slight hemorrhage and pain and was immediately placed in the hospital. Daily intramuscular injections of corpus luteum preparations failed to control the hemorrhage, and five days later she miscarried. Upon delivery, the fetus was found to have undergone degeneration, obviously having been dead for several days. The patient could give no explanation for the miscarriage. Despite the unfortunate outcome of this pregnancy, it is possible that she may again conceive and be delivered at term.

On Dec. 18, 1940, approximately six weeks after her miscarriage, another Rubin test was performed and the tube was found to be fully open.

Considering the fact that this patient had only one tube through which conception could have taken place, one is encouraged in the belief that tubal stricture is not so hopeless as has been pictured, and that many patients, particularly those whose organs are intact, might have their wish for children fulfilled through salpingostomy when stricture is found to be responsible for their sterility.

OVARIAN HEMORRHAGE

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DURING the past few years there has been an increasing interest in the pathologic conditions of the female pelvis, and their relation to disorders of the abdomen requiring surgical intervention. One of the most interesting and most frequently encountered of these is ovarian hemorrhage due to rupture of the graafian follicle or corpus luteum. Whether pathologic or physiologic, this rupture may cause abdominal pain serious enough to necessitate immediate operation, or so mild that close observation and rest in bed is the only treatment necessary.[3]

This condition was first called to our attention when we noticed that many of our cases of chronic recurrent, or subacute appendicitis with an atypical history were found to have at laparotomy an innocent appendix. The real source of the abdominal discomfort was found to result from the pathologic physiologic process of ovarian development.

The first recognition of abnormal ovarian hemorrhages from rupture of ovarian retention cysts was made, according to Guy and Rotonds[1], by Nelaton in 1851. However, Odernatt in 1923 was the first to draw attention to the fact that even though only 42 authentic cases had been reported in the literature up to that date 1 per cent of the female patients operated on for acute appendicitis had intra-abdominal hemorrhages not traceable to ruptured ectopic gestation. To date there have been less than 400 cases reported in the literature.[2] This condition is not as rare as it was formerly thought to be, but its recognition and preoperative diagnosis still remain difficult.

To understand clearly the clinical results of ruptured ovarian retention cysts, it is essential to review briefly the normal physiology of ovulation, and the deviations that may occur from development of pathologic ovarian cyst. The ovary contains innumerable primordial cells which vary in degree of development. As an individual ovum develops under the impulse of the anterior pituitary gland, it is deeply situated in a cyst-like structure which is lined with granulosa cells, described by De Graaf and called graafian follicule. During the mid-menstrual cycle the mature graafian follicule ruptures and expels the ovum. The follicle fills with blood

and fibrin forming the corpus hemorrhagicum, the granulosa cells then are transformed into luteal cells and the corpus luteum develops. Should conception not occur the corpus luteum degenerates and remains as an orange-pigmented scar. Should conception take place the corpus luteum develops into a mature corpus luteum and the pregnant uterus remains under its influence until about the fourth month, when the corpus begins to disappear. Should spontaneous rupture of the corpus result before the fourth month of pregnancy, abortion will take place.

In the normal process of development both the graafian follicle and corpus luteum are minute structures just visible to the naked eye. Should hypersecretion take place or should the graafian follicle fail to rupture, or the corpus fail to disappear, a pathologic condition results which has been termed a graafian follicle cyst, or corpus luteum cyst. Both are classified under the heading of retention cysts.

Due to the many variables in the menstrual cycle of women, the exact time of ovulation is difficult to determine, even in a well controlled experimental group. The physiologic rupture of a graafian follicle (or ovulation); and the formation of the corpus hemorrhagicum is thought to occur from 12 to 14 days prior to the onset of menstruation, or in a 28 day cycle from 14 to 16 days following onset of menstruation. The corpus luteum is fully mature just prior to the onset of menstruation; therefore, any process, traumatic, hormonal, or other, which causes rupture of the graafian follicle might produce pain in the mid-menstrual period, and rupture of the corpus might produce pain in the premenstrual period. The severity of the symptoms depends upon the amount of intraperitoneal hemorrhage which occurs. It might vary from a small amount of whitish-yellow coagulated fluid, to a full-blown intra-abdominal hemorrhage.

Novak states the occurrence of hemorrhages will depend largely upon the location of the rupture of the cyst structure in relation to its blood vessels. If they lie near the surface when it ruptures, an extensive hemorrhage will result; whereas rupture in a relative avascular area might produce very little bleeding.

Occasionally these cysts produce an abnormal type of vaginal bleeding, not unlike that of ectopic gestation. This bleeding might be explained by an excess of estrin which is secreted by an abnormal cyst.

The age of the patient varies. In a series of 58 cases reported by Hoyt and Meigs[3], the age varied from 14 to 41 years. In another

series of 52 cases reported by Guy and Rotonds[1] the age varied from 14 to 46 years. The greatest number of cases in both series were in the second or third decade.

The role that trauma plays in this condition is difficult to determine. It is interesting to speculate whether spontaneous intracystic bleeding is a forerunner of rupture; or whether bleeding is the result of rupture produced by extracystic factors[2]. Both intracystic and extracystic factors probably play an important role in many cases. Any factors which alter the hormonal balance or the increased vascularity of the pelvic organs might cause an intracystic hemorrhage. Such extracystic factors as: (1) pelvic examination (2) direct blows on the abdomen (3) coitus (4) increased intra-abdominal pressure (straining at stools, lifting heavy objects, vomiting, etc.) can be elicited in the history of many cases.

The extent of the intra-abdominal hemorrhage determines to a large degree the clinical features of this condition. In a study of 45 proven cases Harris and Groper[2] have classified these into three distinct groups: (1) Those suffering from mild hemorrhages, by which is meant finding at laparotomy less than 100 c.c. of blood or bloody fluid. (2) Those suffering from moderate hemorrhages, 100 to 500 c.c. (3) Those suffering from hemorrhages greater than 500 c.c. of blood. This classification is far from adequate for many patients will show marked symptoms from small hemorrhages and many phlegmatic women will show few symptoms from a moderate hemorrhage. It is only when blood want with the signs of shock begin to appear, that the Harris and Groper classification seems to be sufficient. By far the greatest number falls in the mild and moderate classification.

GROUP I.[2] This group comprises by far the greatest number of the recognized and unrecognized cases. It is conceivable that every woman at the time of ovulation will have a greater or less degree of intra-abdominal blood spill, and that this with the follicular fluid will constitute some degree of peritoneal irritation. The majority of these patients complain of right-sided abdominal pain. We believe this can be partially explained because the public is educated to the fact that right side pain may mean appendicitis and that the milder hemorrhages from the left ovary are passed off as "gas" or some other indefinite complaint. A careful history is essential. In many cases a definite relationship with ovulation can be elicited. This is especially true of the recurrent monthly attacks of abdominal pain.

There may be a history of sudden, sharp, cramp-like lower abdominal pain, which soon may localize in either lower quadrant. The attack may be mild enough to cause little discomfort, or severe enough to cause the patient to go to bed. The initial pain may last from 2 to 3 hours and pass away giving complete relief. A few hours or a few days after the onset there may be noted a vague, indefinite soreness which disappears and reappears at intervals. Nausea appears without vomiting in 75 per cent of the patients. These patients are frequently kept under observation on the suspicion of a subacute surgical condition of the abdomen two or three days, and are then discharged, or explored because of persistence of the symptoms. The abdominal findings are indefinite and constitute little more than mild lower abdominal tenderness without muscular rigidity. Rectal or vaginal examination may reveal some ovarian tenderness. The temperature and pulse rarely rise above normal. The blood count remains about normal, although in the extreme cases the leukocyte count may rise to 12,000 or 15,000; if so, it usually subsides markedly in 18 to 24 hours.

GROUP II. The onset of this group is similar to Group I, except that the findings are more marked. The initial pain is usually more severe, and the duration of the pain longer. A cessation of pain for a short interval may take place, to be followed by the return of the symptoms which usually persist. The pain is usually localized in the lower abdomen and the point of maximum intensity may be over either the right or left ovary. The character of the pain is a mild colicky or dull soreness. As hemorrhage progresses the soreness shifts to the upper abdomen, or may be elicited in this position by placing the patient in the Trendelenburg position. Shoulder pain is often present: in the absence of gallbladder disease this is almost pathognomic of intra-abdominal hemorrhage. Mild nausea and vomiting are common. Mild symptoms of blood loss may be present. The temperature may be slightly elevated, although there is little elevation of the pulse rate. Abdominal tenderness is constant, chiefly over the lower abdomen. Muscular rigidity and rebound tenderness are mild. Pelvic examination may or may not reveal an adnexal mass. When present the mass is usually tender and if hemorrhage has been sufficient, there will be tenderness of the entire pelvis. In the majority of the patients there is a definite increase of the white cells: the count may vary from 8,000 to 20,000 or 23,000. The average count is about 10,000 to 12,000.

GROUP III. This group comprises the more severe type of intra-abdominal hemorrhage and presents less confusion in diagnosis. The indications for surgery are clear cut. The patient is extremely

sick and shows evidence of blood loss. The abdomen shows moderate generalized tenderness, a doughy rigidity and may show some shifting dulness. Shoulder pain is common. Recto-pelvic examination may show an adnexal mass or a fulness of the cul-de-sac. Pelvic tenderness is usually present. If a cul-de-sac aspiration is attempted it will show the presence of blood. The temperature shows slight elevation, the pulse rate usually rises and a secondary anemia is common. The white count varies, but seldom rises above 20,000.

Group I and Group II are most frequently confused with chronic recurrent, subacute, and acute appendicitis. There is not a single diagnostic feature applicable to either condition. The atypical type of appendicitis with an atypical position is certainly misleading. In general, subacute appendicitis gives a history of a more mild onset, more pronounced gastrointestinal symptoms, slight elevation of temperature and there is frequently point tenderness over McBurney's area. The ruptured retention cyst frequently has a more pronounced onset, less severe or absent gastrointestinal symptoms, normal temperature, higher leukocyte count, a history of similar attacks in either lower quadrants, and the point of maximum tenderness is just above Poupart's ligament. In many cases the differential diagnosis is impossible. We believe that if the symptoms, which at the onset were not severe enough to warrant exploration, have not disappeared or markedly regressed in 72 hours, a laparotomy is justifiable. Appendicitis may occur simultaneously with ruptured retention cysts.

The next most common error of diagnosis is ruptured ectopic pregnancy. The occasional vaginal spotting and the occurrence of massive intra-abdominal hemorrhage confuses the diagnosis. In ovarian hemorrhages there is usually no history of amenorrhea and the Friedmann test is persistently negative.

Recurrent, acute or subacute salpingitis is frequently mistaken for this condition. In ovarian hemorrhages the history is widely different, the patients are usually afebrile and the sedimentation test is normal.

Acute Meckel's diverticulitis and acute sigmoid diverticulitis are differentiated by the septic febrile response.

Twisted ovarian cyst or a twisted hemosalpinx usually has a more severe, progressive course, and on pelvic examination a tender adnexal mass can be palpated.

Endometriosis, although uncommon, does occur but this condition has a definite menstrual relationship.

A proper diagnosis is frequently difficult to make, especially in the moderate group. The management of these cases frequently calls upon the keenest sense of surgical judgment. The greatest difficulty in the path of an accurate diagnosis is "the anterior abdominal wall." It is better to open many and find little, than to overlook some and leave many. Those cases which have a lesser degree of intraperitoneal hemorrhage will subside without difficulty, but many atypical conditions of a far more serious nature have an onset with similar complaints. One must at all times have a high index of suspicion.

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A BRIEF HISTORY OF SURGICAL SOCIETIES

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In tracing the development of surgical societies it has been necessary to condense and to omit altogether a great many facts concerning some of the less widely known societies as well as the discussion of societies more limited geographically. Therefore, no state organizations except the two in Texas and no municipal societies except the earliest two, those in New York and Brooklyn, will be mentioned.

No doubt the close association of those individuals performing surgery dates back almost as far as surgery itself; however, since the first medical school conferring degrees, the University of Salerno in Italy, was not founded until the latter part of the eleventh century, it is not necessary to go further back than that to trace the development of surgical organizations as we think of them today. Before the twelfth century surgery was in the hands of the monastic orders, and that practice continued until surgery was divorced from the Church by Pope Alexander. The status of the barbers then gradually became higher because to them fell the discarded work of the monks. Previously the barbers had done little more than shave the heads of their clerical superiors and bleed them.

As early as 1308 the legal records of England show that the Barbers Company of London was in existence and in that year Richard le Barber was presented and sworn before the court as Master and Supervisor of the Barbers Guild.

The Guild or Fellowship of Surgeons of London is first mentioned in the year 1369 when two masters of the Guild were sworn before the court and given power to report faults of unskilled surgeons. For many years there was intense rivalry between the barbers and the surgeons, each trying to attain supremacy in authority and jurisdiction in all matters pertaining to the practice of surgery. However, in 1540 the two companies united and remained so for nearly 200 years, the permanent separation occurring in 1745 under George II. Meanwhile similar organizations in Scotland, Ireland, and France had appeared.

As early as 1268 the surgeons were incorporated in France by Louis IX, who, incidentally, founded the College of Surgeons of

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Paris and dedicated it to St. Cosmos and St. Damian. No further mention is made of French societies until 1731 when the Royal Academy of Surgery was founded and was active until 1793. It was then overthrown by Revolutionists. No further organizations are recorded until in 1843 when the Society of Surgery of Paris was created, and out of this grew the French Surgical Association in 1884.

In Scotland the Surgeons and Barbers of Edinburgh was formed in 1505, and in 1599 the Physicians and Surgeons of Glasgow was incorporated. In 1778 the Royal College of Surgeons in Edinburgh was created.

In Ireland the Dublin Barbers and Surgeons were granted a certificate in 1639. The charter establishing the Dublin Surgeons Society was granted by James II, but not until 1721 did the organization meet regularly. The Royal College of Surgeons of Ireland was chartered in 1784 by George III.

Following the separation of the Barbers and Surgeons in England in 1745, the Surgeons Guild remained such until 1800 when it was reincorporated by George III under the name of Royal College of Surgeons in London. The name was changed to the Royal College of Surgeons in England in the year 1843.

The first society for surgeons of the same nationality was the German Society for Surgeons formed in 1872. This organization admitted any doctor who specialized in surgery and who was recommended by two members of the society. From the time of its organization it has held a three and a half day meeting in Berlin with 75 to 85 ten minute papers with free discussion and criticism. Original works have always been given preference on the programs. The membership grew from 81 at the first meeting to a maximum of 2,559 in 1933. The influence of this novel society was widespread and is reflected in the organization of similar societies, such as the Italian Surgical Society in 1882 and the French Surgical Society in 1884. Organizations fashioned along the same lines appeared in other countries of Europe, South America, and Japan. This novel type of society differed materially in purpose from the Royal College of Surgeons of England, Ireland, and Scotland in that the latter served primarily as licensing and certifying boards instead of forums for discussion of surgical progress.

In England the first surgical forum had its beginning in the Surgical Section of the British Medical Association, which was founded in 1868 and gradually became an important center for discussion of advances in the practice of surgery. In 1920 the As-

sociation of Surgeons of Great Britain and Ireland was formed and adopted the plan of an annual three day meeting with the forenoons devoted to papers and the afternoons to operative clinics.

The Australasian College of Surgeons was first suggested in 1920 but not actually formed until 1926; and in 1930 the King of England granted the right to attach the prefix "Royal," giving the name of Royal Australasian College of Surgeons to the society. It is interesting to note that several Fellows of the American College of Surgeons were invited to participate in its founding.

The first surgical societies formed in this country were the American Surgical Association in 1879, composed chiefly of teachers and limited to 150 members, and the New York Surgical Society, a municipal organization, in 1879, which was limited to 15 members and has now been increased only to 20 members.

In 1886 the Alabama Surgical and Gynecological Association was founded, it being emphasized that the work was to be scientific and entirely unrelated to other medical matters, but in October 1887 it was decided to change the name to the Southern Surgical and Gynecological Society and to enlarge the scope of this organization to include the profession of the Southern States and "realizing that science knows no bounds, disregarded the geographic considerations and soon instituted the policy of inviting prominent surgeons of other sections of the country to become members." In 1916 the name was changed from the Southern Surgical and Gynecological Association to the Southern Surgical Association. Today there are 251 members from 25 states, there being 13 from Texas, 12 from Louisiana, but none from Arkansas, Oklahoma, and New Mexico.

In 1887 the Brooklyn Surgical Society was formed. In 1890 the Western Surgical Association was organized, and at present its membership is limited to 200 senior members with the membership representing 24 states, including two from Oklahoma, one from Texas, but none from Arkansas, New Mexico, and Louisiana.

The Society of Clinical Surgery was organized in 1903 with semi-annual meetings and with the members being primarily from outstanding medical schools. The prime object of the organization was to keep the surgeons informed of surgical progress. The programs consisted of operative and dry clinics and laboratory demonstrations, and these programs were arranged with the idea that the demonstration of surgical practice was far more important than the presentation of surgical theories in papers. Its present membership includes 40 active members and 40 senior members from

16 states and Canada and also includes some foreign honorary consultants. As in the beginning, the membership is still largely comprised of teachers from outstanding medical schools.

While a guest of this Society of Clinical Surgery, Dr. Franklin Martin saw the possibility that the principles of this Society could be made available on a larger scale to surgeons throughout the country. This idea resulted in the formation of the Clinical Congress of Surgeons of North America which had its first meeting in 1910. In 1912 Dr. Martin presented a proposal for an American College of Surgeons to the 2,000 members attending the Clinical Congress. The resolution was adopted May 5, 1912, and on Nov. 25, 1912, was made a regular corporation under the laws of Illinois with the first convocation held Nov. 13, 1913. The 1937 membership showed between 11,000 and 12,000 Fellows from the United States, Insular Possessions, and Canada, and 385 Fellows from 37 other countries.

The North Pacific Surgical Association was organized in 1912 with members from Oregon, Washington, and British Columbia. At the present time the membership is 51 active and 26 senior members, and the Association has an annual meeting.

The New England Surgical Society was founded in 1916 with six New England states represented, the membership at present consisting of 90 active and 32 senior members, and the Society has an annual meeting.

The Texas Surgical Society was founded in 1915 along the same lines as the Southern Surgical Society but with a membership limited to Texas surgeons. The Texas Railway Surgical Society was formed in 1916, with a primary purpose of prevention of the spread of typhus fever from Mexico. The name of this Society was changed in 1938 to the Texas Railway and Traumatic Surgical Association.

The Pacific Coast Surgical Association was formed in 1925, with California, Oregon, Washington, and Hawaii represented. There are 59 members now and they have an annual meeting.

The Southern Society of Clinical Surgeons was organized in 1926, the purpose being a study club, with an annual meeting culminating in a clinical tour. The members must reside in the South when elected to membership. At the present time there are 48 members, two being from Texas.

The Southeastern Surgical Congress was organized in 1930 with the primary purpose of promoting postgraduate surgical training in the territory it embraced, originally seven States, now eleven. It

presents a three day Postgraduate Surgical Assembly each March, and publishes the papers delivered in a monthly journal, THE SOUTHERN SURGEON. The SURGEON also accepts other original papers and in 1940 became the official organ of the Texas Surgical Society. Applicants for Fellowship in the Congress are passed on by the Executive Committee of the State in which they reside. The present membership exceeds 600.

The American Association for Surgery of Trauma was started in 1938 by a small group of surgeons who recognized the need of more extensive study of traumatic cases. This need had previously been discussed at the meetings of the Western Surgical Association and the Southern Surgical Association.

In 1939 the Indo-Latin College of Surgeons was organized with its first meeting held in Mexico City, this organization being along lines similar to the American College of Surgeons with its membership coming from Mexico, Central American countries, and South American countries.

It can be noted from the foregoing paragraphs that the surgical societies have varied considerably as to their scope as well as their purposes. In Europe the societies had been organized from the very beginning as licensing and examining boards, a certificate being necessary before a diploma from a medical school would be granted a student of medicine. It was not until 1867 that the surgical section of the British Medical Association was organized for the presentation and discussion of surgical advances. On the Continent the idea for a surgical forum was introduced by the organization of the German Society for Surgeons in 1872.

The first organization in this country, the American Surgical Association in 1879, was national in scope but its membership was very limited numerically and composed chiefly of teachers. Because of these facts it was only natural that sectional societies should begin to appear. The general purpose of most of these sectional societies was to bring the surgical profession of that part of the country closer together, both socially and professionally, as well as to promote the progress of surgery in general.

The organization of these sectional societies has continued up to the present time, there being eight sectional societies now, with only one part of our country not covered by a society of this type, namely, the southwest. The states of Oklahoma, New Mexico, Arkansas, and Arizona have practically no members in any society except the American College of Surgeons. A great deal of overlapping of membership has developed among the sectional groups

due chiefly to the adoption of rules permitting election of prominent surgeons of other parts of the country as members and to the fact that many surgeons change locations after being elected to membership in a given society.

In spite of the differences in types of membership, location, and so forth, of societies, one paramount purpose, the advancement of the art and science of surgery, has remained common to all societies. The American College of Surgeons has been foremost in this purpose with its gradually broadening supervision of hospital administration as well as its newly made advances in improving and systematizing post-graduate instruction in surgery.

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THE ROLE OF THE LIVER IN SURGERY

For a long time there has been scattered testimony to the part played by the liver in certain surgical diseases, at least. Thus Chauffard wrote in 1890, "There is no disease of the gall-bladder ducts. The only disease is that of the liver cells themselves." Graham, in 1918, demonstrated that hepatitis of some degree is an almost constant accompaniment of biliary tract disease of any degree. Heyd since 1924 has been emphasizing the importance of the hepatic factor in the mortality of biliary tract surgery. Laird and his associates made one of the first comparative studies of liver function tests in 1926, and a very comprehensive one, at that. Judd, in 1929, pointed out the significance of the small, atrophic liver sometimes found at operation. Shallow, in 1930, found the explanation of a "certain unexplained surgical mortality" in low values for liver function tests. Graham, a year later, found in the same low values the explanation of four entirely unexpected catastrophes after biliary tract surgery. Robertson, Swalm and Konzelman wrote in 1932 that only in an emergency should any patient be operated on without a preoperative determination of his liver function, especially any patient in whom dysfunction was for any reason a possibility.

Such a concept opens up an entirely new field of thought. Hepatic dysfunction is a possibility in a great many cases in which it is not usually suspected. A great deal of evidence has accumulated to the effect that silent, sub-clinical hepatic damage and dysfunction are by no means infrequent in the general population. Rozendaal and his associates at the Mayo Clinic, Weir, Bloomfield, Hurst and

Henschen are only a few of those who have adduced proof for this thesis and who have pointed out that dysfunction of this sort can be recognized only in the laboratory.

From the surgical standpoint it is extremely important that hepatic dysfunction be recognized before operation; serial studies of liver function show, almost without exception, a more or less marked depression after any type of operation and any type of anesthesia unless a definite effort has been made to forestall it. The effort is practically always made in the patient whose critical hepatic state is apparent; it is very rarely made in the patient whose dysfunction is sub-clinical. For this reason the so-called "good surgical risk" is sometimes in serious danger, for the patient with a badly damaged liver is a potentially poor risk for any sort of surgery for which he is not especially prepared. It was of such patients that Rowntree was probably thinking when he said, in discussing a study of liver function by Piersol and Rothman, that perhaps the greatest good which had come out of the search for adequate methods of studying hepatic function had been the awakening of interest in the state of the liver, in which regard, he went on, most internists, at least, "had been asleep in Zion and were in need of a great awakening."

How effective such an awakening can be is shown in the reports of surgeons who consistently evaluate the liver factor in surgery. Thus Graham, over two comparative three-year periods, was able to reduce his mortality for cholecystectomy from 6 to 0.5 per cent, and his mortality for common duct surgery from 7.7 to 2.0 per cent by the performance of liver function tests, with preoperative preparation on the basis of their values. Althausen, in 1939, reported that through the cooperation of the Departments of Medicine and Surgery at the University of California, hepatic function tests are now employed routinely at the University Hospital, and as a result the mortality of cholecystectomy has fallen from 10 to 2 per cent.

Few surgeons now living can remember a time when examination of the heart and lungs and studies of the state of the kidneys were not employed routinely before operation. Yet few surgeons, curiously, make any attempt to study before operation the state of the liver, which is the largest organ in the body, which performs the greatest number of functions, and without which life can persist for only a very brief time. That even the best functional tests now available do not tell the whole truth about the state of the liver is scarcely an excuse for ignoring that organ entirely. Half a loaf is still better than no bread.

The surgeon who takes the position that the state of the liver is an important consideration in the results of all surgery is not an alarmist. As a matter of fact, the idea that even the patient with a badly damaged liver cannot withstand surgery and should be refused it for that reason is no part of his philosophy. On the contrary, he takes the position that it is far easier to protect the patient with a damaged liver against the result of his disability than it is to protect patients with damaged hearts and lungs and kidneys against the results of theirs.

Protective measures are simple and easily applied. They include: the use of glucose, preferably by mouth if the patient can take it, supplemented by other routes as necessary; the inclusion of a certain proportion of protein in the diet, to facilitate the conversion of glucose to glycogen in the liver; the maintenance of the proper fluid balance, for the utilization of glucose is decreased in the presence of dehydration; vitamin K-bile salt therapy if the hemorrhagic diathesis is part of the picture; the use of transfusion and oxygen therapy in selected cases; an operative procedure carefully calculated to correct the pathologic process with a minimum of trauma; wisely selected anesthesia; and intensive postoperative therapy to bolster liver function. In short, preoperative estimates by available liver function tests, the continuation of preoperative therapy up to the very moment of operation, and the institution of postoperative therapy as soon as the operative act is concluded will usually carry even the patient who is most critically ill from the hepatic standpoint safely through the surgical ordeal.

Deaths due to liver damage and dysfunction continue to occur, but these facts suggest that there is little excuse for most of them.

FREDERICK FITZHERBERT BOYCE, M.D.

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.*

OFFICE UROLOGY, *with a Section on Cystoscopy*. By P. S. PELOUZE, M.D., Assistant Professor of Urology, University of Pennsylvania; Consulting Urologist, Delaware County Hospital; Special Consultant to the United States Public Health Service; Member of Board of Directors, American Social Hygiene Association and American Neisserian Medical Society. 766 pages, with 443 illustrations, 19 of them in color. Price, $10. Philadelphia and London: W. B. Saunders Company, 1940.

"They will grow to see a urogenital tract around which a man has been draped. . . . Their older, slower brothers will see a man who happens to have a urogenital tract." The former are young aspirants whose interests are too largely surgical, who are over-anxious to pass the requirement of fifty operations so that they can be "specialists" in urology. The latter are those better equipped ones who realize that medical urology is fundamental, and that where one patient needs an operation, hundreds can be so treated as to avoid many surgical procedures.

This is the thesis of Dr. Pelouze's book, which is, as the title says, Office Urology. His great emphasis is on the patient as a person. He realizes that by far the majority of complaints are minor in nature, and that these are often overlooked as prosaic, whereas really these are the most important because both are numerous and because more serious conditions can be aborted by the treatment of the early ones.

The book is more dedicated to general practitioners than to strict urologists, though the latter might profit by the attitude that is stressed. Almost half the book is devoted to office equipment and arrangement, general methods of examination and treatment, and general technic in handling urologic cases. The genito-urinary tract is taken up in order from below upward. A large section concerns cystoscopy and roentgenography, with excellent descriptions and illustrations.

The book is not one of symptom diagnosis, but instead emphasizes scientific principles upon which diagnosis is to be made. It is not as complete as some, for it presupposes some intelligence and information on the part of the reader, but it is concerned with things which will be more commonly encountered instead of those that belong in a museum of curiosities. There is a wonderful insight into emotional and psychic problems which is rarely given to physicians in any field. A chapter on sexual problems is one of the highlights.

The book is so well written, so highly readable, so intensely practical that you can not pick it up to glance at it or to look up a reference without reading more than you intended.

HISTOPATHOLOGY OF THE PERIPHERAL AND CENTRAL NERVOUS SYSTEMS. By GEORGE B. HASSIN, M.D., Professor of Neurology, University of Illinois, College of Medicine; Attending Neurologist, Cook County Hospital, Chicago. Second Edition (Revised and Enlarged). 554 pages, with 302 illustrations. Price, $7.50. New York and London: Paul B. Hoeber, Inc., 1940.

Science, medical or general, of course recognizes no national boundaries and we have no sympathy with those "100 per cent Americans" who can see no good in what is accomplished in other parts of the world. However we do

secretly rejoice in the pre-eminence attained by our fellow-citizens in certain fields. In none is this pre-eminence more marked than in the histopathology of the nervous system.

While we know that the ancient Peruvians achieved considerable skill in opening the skull successfully, and that in historic times other operations were done on the head, the fact remains that the late great Dr. Cushing was the real founder of brain surgery, and that he trained many of the leading exponents of this art, some of whom returned to their homes beyond the seas. Cushing's students and other Americans have, we think, done more to advance histopathology of the nervous system in the last 15 years than all the other workers in the world's history. It is natural that Dr. Hassin's book should require a new edition and we are proud to acclaim it.

This book, one must admit, is not to be recommended for bedside reading. The clinical data are compressed so the average diagnostician will receive little help in deciding whether or not a brain tumor, for example, is present and, if so, where it is located. We do not insinuate that the information given here is not of practical value, for Percival Bailey in particular has pointed out the tremendous clinical value of a knowledge of histopathology in dealing with intracranial neoplasms. The neurologist, the neurosurgeon and the pathologist, therefore, should find this volume a godsend. At this time it is without a rival in its field.

The photomicrographs are abundant, well chosen and beautifully reproduced. A good bibliography and the special technics used in preparing nervous tissue for microscopic examination serve to complete the volume.

FOREIGN BODIES LEFT IN THE ABDOMEN. *The Surgical Problems: Cases, Treatment, Prevention; The Legal Problem: Cases, Decisions, Responsibilities.* By HARRY STUGEON CROSSEN, M.D., School of Medicine, Washington University, and DANIELL FREDERIC CROSSEN, LL.B., School of Law, Washington University, St. Louis. 762 pages, with 212 illustrations, including 4 color plates. Price, $10. St. Louis: The C. V. Mosby Company, 1940.

"Sponge missing!" is a cry that all surgeons know, either by personal experience or by hearsay. This verdict may be right or wrong, or the count may be "correct," only for the terrible reality to be discovered later. At any rate, sponges and other foreign articles are left in the abdomen, and this is a complication which causes many a bellyache for patient and headache for doctor.

Here is a book dedicated to the problem, written by two Crossens, a surgeon and a lawyer, for both medical and legal aspects are essential for coverage of the subject.

Medical jurisprudence is not clearly formulated like constitutional law, for instance, and each case is decided individually, though decisions from previous cases are beginning to formulate policies. Therefore the way to become acquainted with the situation is to study cases and this book is in admirable style. A vast amount of research has been done in assembling cases, presenting them first in a chronologic table, and then breaking them down according to the nature of the cases. The presentation is so condensed that a large number can be covered, getting the point across without waste of time or effort.

The medical section also has excellent chapters on diagnosis, treatment and prevention of the accident. Swallowed articles are discussed, as are also deception and malingering; these are becoming more important in claims against doctors.

The legal section presents the general principles as seen in court action, the theory of recovery and of defense, and the state of limitations. One chapter devoted to damages is most instructive.

The book does not tell the actual law about certain cases, for the law is not clear-cut, and it varies in different localities, but an excellent introduction is given. This good general understanding should be followed by the doctor's learning the principles which hold in his own locality.

The up-to-date surgeon can not afford to overlook this important problem, and the Crossens' book will save him much time in gaining the information he needs. What makes the book even better is that it is so well written that, if you are at all interested, you will be apt to read the whole volume without effort or complaint.

A Textbook of Surgical Nursing. By Henry S. Brookes, Jr., M. D., Instructor in Clinical Surgery, Washington University School of Medicine; Surgeon to the Out-Patients, Washington University Dispensary; Assistant Surgeon to Homer G. Phillips Hospital, and Pearl Castile, R. N., A. B., M. A., Assistant Director, School of Nursing, University of California. Second Edition. 663 pages, with 235 illustrations. Price, $3.50. St. Louis: The C. V. Mosby Company, 1940.

For the improvement of his book, Dr. Brookes has added as co-author a nurse who is a teacher of nurses. This is timely, since the book is intended for nurses, to increase their ability to cooperate in the handling of surgical cases.

The authors have struck a fortunate blend between the medical and nursing aspects. It is presumed that the nurse's interest and efficiency are increased by an acquaintance with the pathology and symptomatology of surgical conditions, and the purpose of surgery as applied to these conditions. The main value of the book is this insight given to the nurse, so that she can really understand what it is all about.

The first third of the book is devoted to general principles of surgery, with special emphasis on nursing procedures and technic. Then most of the book is devoted to surgery of the specific systems and parts of the body. Very important chapters are concerned with special procedures and medicolegal points, and the relation of the nurse to the patient is emphasized throughout. Illustrations are numerous and well chosen, and there is an excellent glossary.

The book should be fascinating to nurses. It cannot take the place of practical training, but it is readable and informative, and should be good as a textbook and ready reference.

Surgery of the Hand. By R. M. Handfield-Jones, M. C., M. S., F. R. C. S., Surgeon to Out-Patients, St Mary's Hospital and Senior Surgeon, Florence Nightingale Hospital, London. 134 pages with 95 illustrations, some colored. Price, $4.50. Baltimore: The Williams & Wilkins Company, 1940.

As the author states in the preface, this book is a compilation of his lectures on surgery of the hand and much of it is derived from Kanavel's standard treatise "Infections of the Hand." The essential facts from Kanavel are incorporated in this book without the extended descriptions. For instance the whole subject of hand infections is adequately discussed in 65 pages. The remainder of the book is devoted to injuries of the hand, tumors and problems of rehabilitation after hand disability.

The following axiomatic quotations give some idea of the value of this "hand book" as a guide for surgical treatment of lesions of the hand:

"Never make an incision until the presence of pus is certain.

"Never make an incision until its exact situation is known.

"Never make an incision on the dorsum of the hand until every other possible site of pus has been eliminated.

"In lymphangitis, incisions can do nothing but harm.

"In lymphangitis of the hand, a careful watch on the axillary region should always be maintained since large collections of pus can form with little outward evidence.

"Tendons depend for their nutrition on synovial sheaths. If this relation is disturbed by ill-advised incisions, the vitality of the tendon is endangered.

"Pure infections of the tendon sheaths are much less likely to cause adhesions than are mixed infections.

"Tenosynovitis in both hands is practically never tuberculous since this infection is always unilateral.

"Any indolent ulcer or nodule on the hand combined with lymph gland enlargement is suspicious of primary chancre. Doctors are peculiarly susceptible to this form of syphilis as are those who receive human bites of the hand.

"Human bites of the hand are always potentially serious. They should be opened widely under general anesthetic.

"Never allow a finger to become stiff. A sling is dangerous but a finger stall is utterly pernicious for its tendency to produce stiffness.

"Manipulation of joints under anesthetic is exceedingly dangerous—"the stiffer a joint the less valuable is manipulation; the more movable a joint, the more valuable is manipulation.

"Compound fractures of the hand must be treated as thoroughly as any other compound fractures (under an anesthetic and in the operating room).

"No amputation should ever be performed of the thumb."

I think this is enough to show clearly how wide is the range of information in this book. It is "curt, clear, complete."

—WALTER G. STUCK, M. D.

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DR. HARRY W. COCHRAN.....1719 Pacific Avenue, Dallas
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DR. R. E .CONE.....324 Twenty-first Street, Galveston
DR. WILLARD R. COOKE.....2202 Avenue M, Galveston
DR. A. G. COWLES.....205 Camden Street, San Antonio
DR. EDWARD W. COYLE.....414 Navarro Street, San Antonio
DR. ROBERT W. CROSTHWAIT.....1724 Austin Avenue, Waco
DR. WILLIAM L. CROSTHWAIT.....1724 Austin Avenue, Waco
DR. JOHN E. DALY.....602 West Tenth Street, Fort Worth
DR. ALBERT P. D'ERRICO.....1719 Pacific Avenue, Dallas
DR. SIM DRIVER.....1719 Pacific Avenue, Dallas
DR. JOHN W. DUCKETT.....4105 Live Oak Street, Dallas
DR. ELBERT DUNLAP.....1719 Pacific Avenue, Dallas
DR. G. W. N. EGGERS.....2201 Avenue D, Galveston

Dr. George R. Enloe.....650 Fifth Avenue, Fort Worth
Dr. A. I. Folsom.....1719 Pacific Avenue, Dallas
Dr. Joseph B. Foster.....1316 Walker Avenue, Houston
Dr. Charles S. Gates, Jr.....806 Main Street, Houston
Dr. Joseph Gilbert.....120 West Seventh Street, Austin
Dr. Joe Thorne Gilbert.....120 West Seventh Street, Austin
Dr. G. F. Goff.....3601 Cedar Springs Road, Dallas
Dr. J. W. Goode.....205 Camden Street, San Antonio
Dr. F. C. Goodwin.....109 North Oregon Street, El Paso
Dr. C. C. Green.....1209 Rosalie Street, Houston
Dr. James Greenwood, Jr.....1215 Walker Avenue, Houston
Dr. A. L. Hathcock.....105½ West Oak Street, Palestine
Dr. Herbert T. Hayes.....1215 Walker Avenue, Houston
Dr. Harry G. Heaney.....416 Chaparral Street, Corpus Christi
Dr. William H. Heck.....414 Navarro Street, San Antonio
Dr. A. Philo Howard.....1625 Main Street, Houston
Dr. W. Lee Hudson.....1719 Pacific Avenue, Dallas
Dr. Hub E. Isaacks.....1212 West Lancaster Boulevard, Fort Worth
Dr. Dudley Jackson.....414 Navarro Street, San Antonio
Dr. Peter M. Keating.....414 Navarro Street, San Antonio
Dr. H. L. D. Kirkham.....1215 Walker Avenue, Houston
Dr. J. Allen Kyle.....806 Main Street, Houston
Dr. Edgar H. Lancaster.....1215 Walker Avenue, Houston
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Dr. G. D. Mahon.....1719 Pacific Avenue, Dallas
Dr. Joseph H. McGuire.....1719 Pacific Avenue, Dallas
Dr. W. H. McKnight.....103 East Seventh Street, Fort Worth
Dr. Allen L. McMurrey.....1215 Walker Avenue, Houston
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Dr. F. L. Paschal.....414 Navarro Street, San Antonio
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Dr. J. E. Pittman.....1215 Walker Avenue, Houston
Dr. T. A. Pressly.....205 Camden Street, San Antonio
Dr. Lloyd I. Ross.....705 East Houston Street, San Antonio
Dr. Rex R. Ross.....414 Navarro Street, San Antonio
Dr. Curtice Rosser.....1719 Pacific Avenue, Dallas
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Dr. W. B. Russ.....205 Camden Street, San Antonio
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Dr. C. E. Scull.....414 Navarro Street, San Antonio
Dr. M. W. Sherwood.....213 West Avenue G, Temple
Dr. C. M. Simpson.....213 West Avenue G, Temple
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Dr. M. B. Stokes.....1625 Main Street, Houston

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Dr. Thomas H. Thomason....1212 West Lancaster Avenue, Fort Worth
Dr. W. B. Thorning.....1625 Main Street, Houston
Dr. Victor C. Tucker.....414 Navarro Street, San Antonio
Dr. B. Weems Turner.....506 Caroline Street, Houston
Dr. J. M. Venable.....414 Navarro Street, San Antonio
Dr. George W. Waldron.....1215 Walker Avenue, Houston
Dr. Samuel D. Weaver.....1719 Pacific Avenue, Dallas
Dr. R. J. White.....810 Houston Street, Fort Worth
Dr. Edward White.....1719 Pacific Avenue, Dallas
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